ÉNERGIE NB POWER

ENERGY APPLICATION SURVEY

1990

91-07144/

NB POWER

ENERGY APPLICATION SURVEY

STRATEGIC PLANNING SEPTEMBER, 1990

FOREWORD

In September, 1990, NB Power and the Power Commission of the City of Saint John (Saint John) conducted a survey of residential customers. The two utilities supply electricity to over 98% of the households in New Brunswick: NB Power 89%; and Saint John 9%.

This mail survey was the tenth such survey conducted by NB Power since 1966 and the second in which Saint John participated. The previous survey was conducted in February, 1988. The city of Edmundston, a participant in 1988, was unable to join in the current survey due to a change in their computer systems.

This "Energy Application Survey" was designed primarily to gather data useful for forecasting electrical requirements of New Brunswick residents. Data gathered through the survey includes: use of household appliances, space and water heating energy sources and equipment, household electrical use characteristics, and customer preferences and intentions with respect to their space heating energy sources and the conservation of energy.

The findings of the survey are summarized in this report. Where possible, the questions in the survey were worded so to allow comparison with previous surveys. The report includes a section showing the saturation trends for selected appliances.

This document presents a selection of results which were considered to be of general interest, and does not include all of the possible analyses or tabulations.

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GENERAL

1.0 GENERAL

1.1 SURVEY METHODOLOGY

The survey itself is shown in section 1.1. It was mailed to some 22,250 customers of NB Power and the Power Commission of the City of Saint John.

The sample pool for NB Power (20,030) represented approximately one (1) in eleven (11) customers; that for Saint John (2,974) was about one (1) in ten (10). About 750 surveys were used internally, or not mailed on the basis that they were not household accounts (churches, farms, etc.).

The pro-rated sample size, number of responses, and total customer base for each on NB Power's fifteen administrative regions (called districts) and the City of Saint John are shown in section 1.2. The regional boundaries are shown in section 1.3.

In all, 8,411 (38%) of the sampled customers responded to the survey.

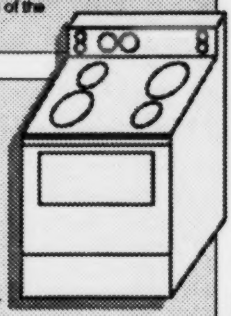
The response rate of 38% was somewhat below the 43% rate in 1988, but is considered acceptable.

The large sample size was chosen to ensure sufficient responses for a high level of confidence in the results. It also allows the breakdown of the data into smaller geographic, demographic, and other groupings, again with enough responses to maintain high levels of confidence in the accuracy of the results. Appendix A shows the reliability of various levels of response at confidences levels of both 99% and 95%.

1.2 SURVEY

YOUR APPLIANCES

Please indicate how many of each of the following you have in your home.



Kitchen Appliances

___ 1 electric range
___ 2 microwave oven
___ 3 toaster oven
___ 4 automatic dishwasher
___ 5 frost-free refrigerator
___ 6 manual defrost refrigerator
___ 7 separate home food freezer

Laundry

Do not include laundry equipment used outside your home.

___ 8 automatic washer
___ 9 other electric washer (wringer, spin dry, etc.)
___ 10 electric clothes dryer

Other Appliances/Household Items

___ 11 color television
___ 12 air conditioner
___ 13 dehumidifier
___ 14 humidifier
___ 15 portable electric heater
___ 16 hot tub/whirlpool bath
___ 17 heat exchanger/heat recovery system
___ 18 pump for well
___ 19 pump for swimming pool
___ 20 water bed heater
___ 21 bathroom ceiling fan
___ 22 range hood
___ 23 automobile block heater
___ 24 programmable thermostat

YOUR HEATING SYSTEMS

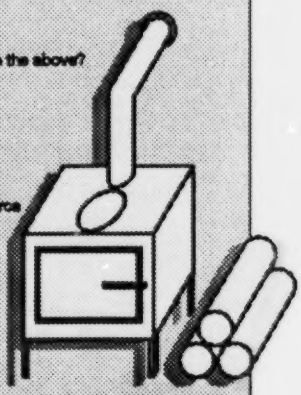
Please check the appropriate response to the questions below.

Primary Heating System

25 Which energy source is used most for heating your home? (check one)

A ☐ electricity
B ☐ oil
C ☐ wood
D ☐ propane
E ☐ other/don't know

26 What type of system is the above? (check one)



A ☐ electric baseboard
B ☐ electric furnace
C ☐ heat pump - air-to-air
D ☐ heat pump - water source
E ☐ radiant cable or foil
F ☐ oil forced air
G ☐ oil hot water
H ☐ wood stove
I ☐ wood furnace
J ☐ propane furnace
K ☐ other/don't know

27 What is the age of the above heating system?

A ☐ less than 1 year
B ☐ 1 - 3 years
C ☐ 4 - 5 years
D ☐ 6 - 10 years
E ☐ 11-15 years
F ☐ 16-20 years
G ☐ over 20 years
H ☐ don't know

Supplementary Heating System

28 What supplementary heating sources do you use (excluding conventional fireplaces)? (check one)

A ☐ wood
B ☐ oil
C ☐ electricity
D ☐ propane
E ☐ solar
F ☐ kerosene
G ☐ other
H ☐ none

29 What is the approximate share of your heating needs provided by supplementary heating?

A ☐ 10% or less
B ☐ 11% - 25%
C ☐ 26% - 50%
D ☐ don't know

Wood Use

30 If you use wood for space heating, how many cords do you use per year? (If not used, go to question 33)

A ☐ 1 cord or less
B ☐ 2 cords
C ☐ 3 cords
D ☐ 4 cords
E ☐ 5 cords
F ☐ 6 cords or more
G ☐ don't know

31 Over the last two years, has the amount of wood you have burned annually:

A ☐ increased B ☐ not changed C ☐ decreased

32 In the future, will the amount of wood you burn annually:

A ☐ increase B ☐ not change C ☐ decrease

Water Heating

33 How is your water heated?

A ☐ electricity
B ☐ oil
C ☐ propane
D ☐ other

34 Is your water heater rented?

A ☐ yes B ☐ no

35 Is your water heater installed in an area which is:

A ☐ heated to the same degree as the rest of the dwelling
B ☐ barely heated
C ☐ not heated
D ☐ other

Conversion:

36 Have you converted your heating system to a new energy source in the last two years?

A ☐ yes B ☐ no

37 If yes, what was your previous heating energy source?

A ☐ oil
B ☐ wood
C ☐ electricity
D ☐ propane
E ☐ other/don't know

YOUR HOME

38 Do you live in

A ☐ single family house
B ☐ duplex
C ☐ condominium
D ☐ apartment/flat
E ☐ mobile/mini home

39 Is your basement

A ☐ fully insulated
B ☐ partially insulated
C ☐ not insulated
D ☐ no basement

40 Do you

A ☐ own your home
B ☐ rent your home

41 Total number of finished rooms in your home, including finished basement (exclude bathrooms and halls).

A ☐ 4 or fewer
B ☐ 5
C ☐ 6
D ☐ 7
E ☐ 8
F ☐ 9 or more

42 What is the approximate finished area of your home, in square feet?

A ☐ less than 600
B ☐ 601 - 1200
C ☐ 1201 - 1800
D ☐ 1801 - 2400
E ☐ more than 2400
F ☐ don't know

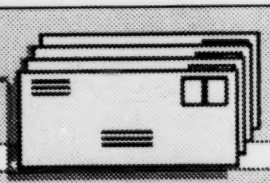
43 How many people regularly live in your household?

A ☐ 1
B ☐ 2
C ☐ 3
D ☐ 4
E ☐ 5
F ☐ 6 or more

44 When was your dwelling built?

A ☐ before 1956
B ☐ 1956 - 1960
C ☐ 1961 - 1965
D ☐ 1966 - 1970
E ☐ 1971 - 1975
F ☐ 1976 - 1980
G ☐ 1981 - 1985
H ☐ 1986 - 1990
I ☐ don't know

GENERAL



45 If you use an automobile block heater, how many hours per day is it used?

☐ hours/day

46 For manual thermostats, do you turn them down in winter:

A ☐ at night and when no one is home
B ☐ at night only
C ☐ only when no one is home
D ☐ not at all

47 Do you read the insert which comes with your power bill?

A ☐ read it carefully
B ☐ sometimes read it
C ☐ sometimes scan it
D ☐ don't look at it

48 The best way for NB Power to communicate with customers is (select one):

A ☐ bill inserts
B ☐ newspaper ads
C ☐ radio
D ☐ television

49 What can NB Power do to help customers conserve energy?

_____

_____

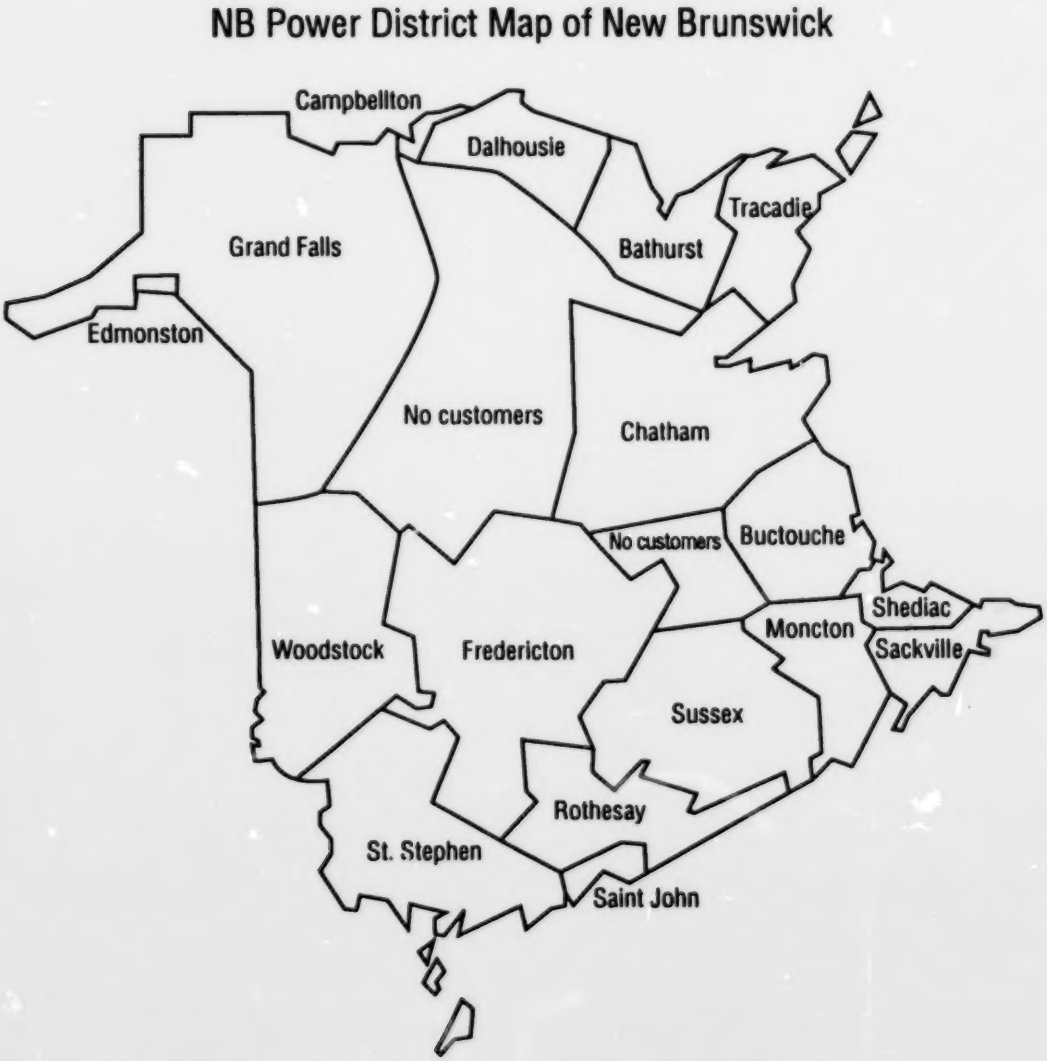
_____

1.3 SAMPLE AND RESPONSES BY DISTRICT

DISTRICT	RESIDENTIAL CUSTOMERS AS OF SEP/90*	SAMPLE SIZE	RESPONSES USED	RESPONSES AS % OF SAMPLE
FREDERICTON	38,266	3,324	1,437	43.2%
WOODSTOCK	11,452	971	378	38.9%
GRAND FALLS	17,813	1,540	484	31.4%
ST. STEPHEN	12,023	1,049	429	40.9%
ROTHESAY	15,791	1,388	589	42.4%
SUSSEX	9,744	852	355	41.7%
CHATHAM	16,049	1,402	484	34.5%
DALHOUSIE	5,682	492	193	39.2%
BATHURST	13,477	1,192	436	36.6%
CAMPBELLTON	5,563	483	146	30.2%
TRACADIE	16,669	1,464	475	32.4%
MONCTON	36,157	3,198	1,357	42.4%
BOUCTOUCHE	8,903	778	285	36.6%
SHEDIAC	7,355	675	262	38.8%
SACKVILLE	5,392	473	175	37.0%
TOTAL NB POWER	**220,336**	**19,281**	**7,485**	**38.8%**
SAINT JOHN	29,954	2,969	926	31.2%
TOTAL NEW BRUNSWICK	**250,290**	**22,250**	**8,411**	**37.8%**

* Excludes churches, seasonal customers, and accounts more than 60 days in arrears

1.4 MAP OF NEW BRUNSWICK SHOWING DISTRICTS



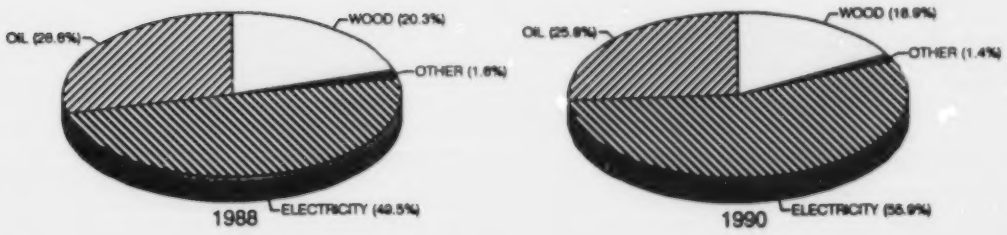
HIGHLIGHTS

2.0 SURVEY HIGHLIGHTS

- Electricity's share of the residential space heating market continues to increase. More than one out of two households (56%) now rely on it as their main energy source for space heating. In 1988 the figure was 50%, in 1985, 37% (pp 17, 61).

- The increase in electric space heating saturation is largely a result of its high penetration in new homes. Of all homes built since 1986, 86% have had electric space heating installed (p 61).

SPACE HEATING ENERGY SOURCE



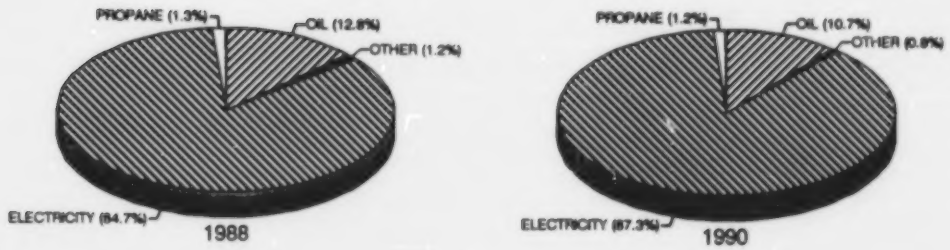
- The use of supplementary heating systems has grown. One in two homes (55%) now have a supplementary system while in 1988 the figure was 46%. Of these, 49% use wood, 32% use electricity, 12% use oil, and 7% use other energy sources (p 20).

- Electric domestic water heating has risen to 87% from 85% in 1988 and

78% in 1985. Among homes using oil for space heating, 63% use electricity for water heating (pp 25, 62).

- The current level of electric water heating penetration reflects nearly 100% level in penetration among new construction (98% of all homes built between 1986 and 1990, and 96% of all homes built between 1981 and 1985) (p 62).

WATER HEATING ENERGY SOURCE



- Microwave ovens are now owned in 75% of the homes in the province, up from 53% in 1988 and 19% in 1985 (pp 12, 63).

- Homes with wood space heating used an average of a about 3.9 cords in 1989/90. Homes using wood as the primary source of space heating used about 5.1 cords, while those using it as supplementary fuel averaged 3.0 cords. Those homes which did not indicate whether wood was the primary or supplementary source averaged 3.5 cords. A total of about 450,000 cords of wood was used for space heating in the province (pp 17, 20, 22).

- About twice as many homes have decreased their wood usage over the last two years (17%) as have increased their usage (7%). About 50% more homes expect to reduce their usage (14%) as expect to increase usage (10%) (pp 23, 24).

- 6% of homes converted to a new space heating energy source over the last two years. Of these, 73% had been using oil (pp 28, 29).

- About 78% of respondents live in single family homes, with a further 6% in mobile or mini homes. 88% of homes are owner-occupied (pp 30, 32).

- On average, there are about 2.9 people per household. In 1988, the figure was almost 3.0 people per household (p 35).

- Customers feel that bill inserts are the most effective way for NB Power to communicate with them (71%). A smaller number feel that television is most effective (18%) (p 29).

- 39% of customers would like more education or information on energy conservation topics. About 18% support the implementation of various loan/grant programs for conservation. Almost 9% asked for personalised energy consultation/audits, a service readily available from each district office (pp 41, 42).

- Of the 86% of homes which have a basement, 63% (54% overall) are uninsulated or only partially insulated, leaving potential for substantial thermal shell efficiency gains in those households (p 31).

RESULTS

3.0 SURVEY RESULTS

The results of the survey are based on 8411 responses that were considered usable on the basis of data edits and response validity checks built into the computer programs developed for data analysis.

The overall responses to the 49 questions asked in the survey are shown in Figures 1 to 29. As a result of an omission in printing, a portion of the Question 27 was left out of the survey. Consequently, the results for that question are not given. Included with each figure is a table showing the numbers for each response and the total responses to each question.

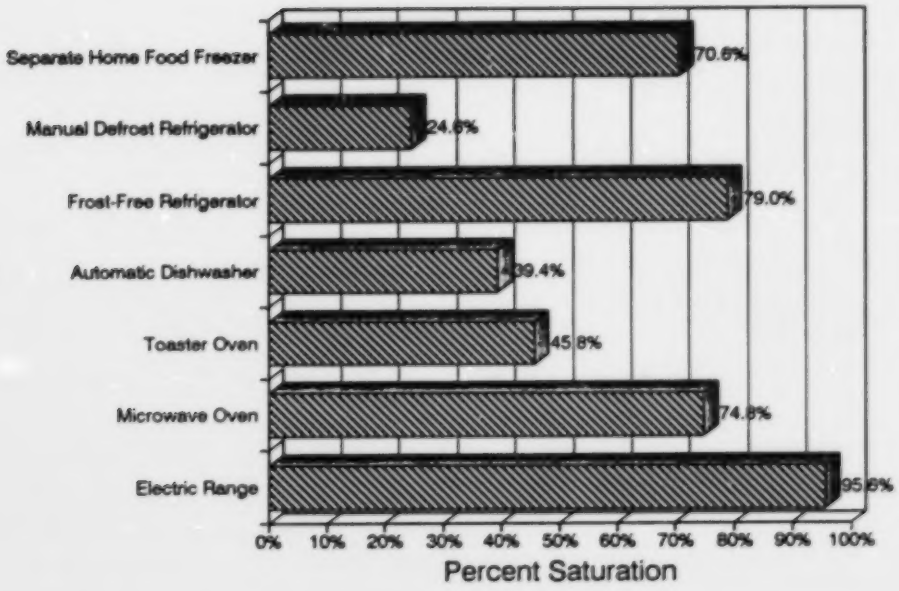
Following the overall results is a set of selected cross-tabulations by region, type of space energy heating source, type of dwelling, age of dwelling, and annual kilowatt-hours used. This is followed by a section on average annual use of households with various combinations of space and water heating energy sources. The final section of this report shows saturation trends for selected appliances since 1968.

3.1 OVERALL FREQUENCIES

The following 31 figures and tables present the results of the 1990 Energy Application Survey. For Questions 1 through 24 (Figures 1 through 5), the number of respondents indicating ownership of the particular appliance is given. A blank for these questions was considered to indicate the absence of that appliance. For Questions 25 through 49, the figures indicate the frequency of occurrence of each response.

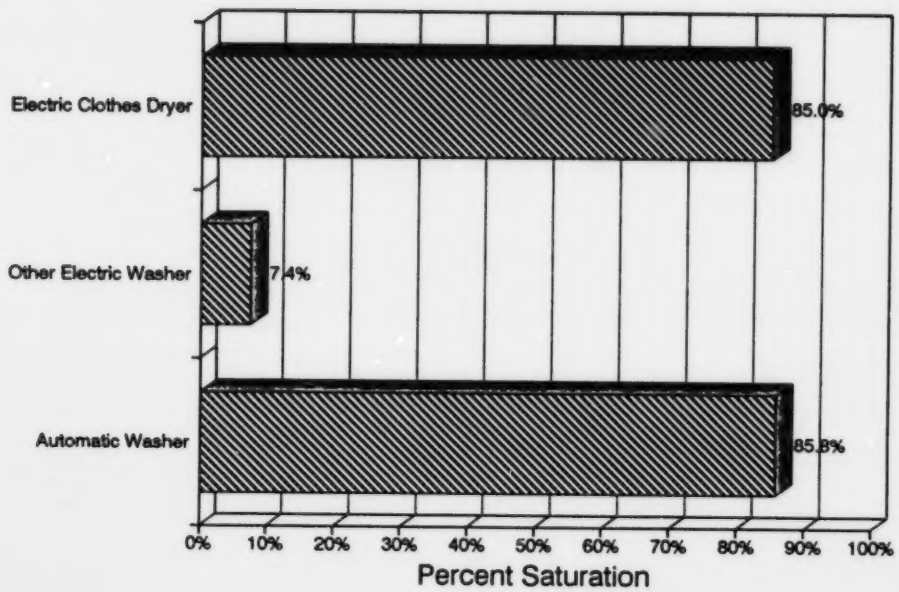
Appliance questions asked for the number of each type found in the household. This enabled the calculation of the total number of each appliance to be found in the sample population. Refrigerators (manual-defrost and frost-free combined) have achieved a greater than 100% penetration, with an average of 1.07 refrigerators per household. Colour televisions are the most common of all the appliances surveyed, with an average of 1.3 per household. Electric ranges and electric clothes washers are at 96% and 94% respectively.

Figure 1
Kitchen Appliances



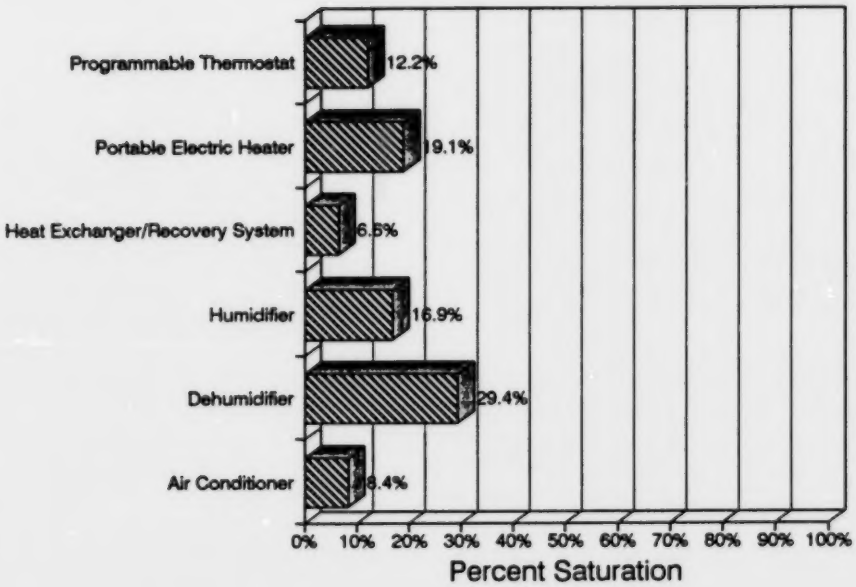
Questions 1-24 Appliance	Number Owning	Total Number Of Respondents	Percent Saturation
Electric Range	8039	8411	95.6%
Microwave Oven	6289	8411	74.8%
Toaster Oven	3850	8411	45.8%
Automatic Dishwasher	3315	8411	39.4%
Frost-Free Refrigerator	6646	8411	79.0%
Manual Defrost Refrigerator	2068	8411	24.6%
Separate Home Food Freezer	5941	8411	70.6%

Figure 2
Laundry Appliances



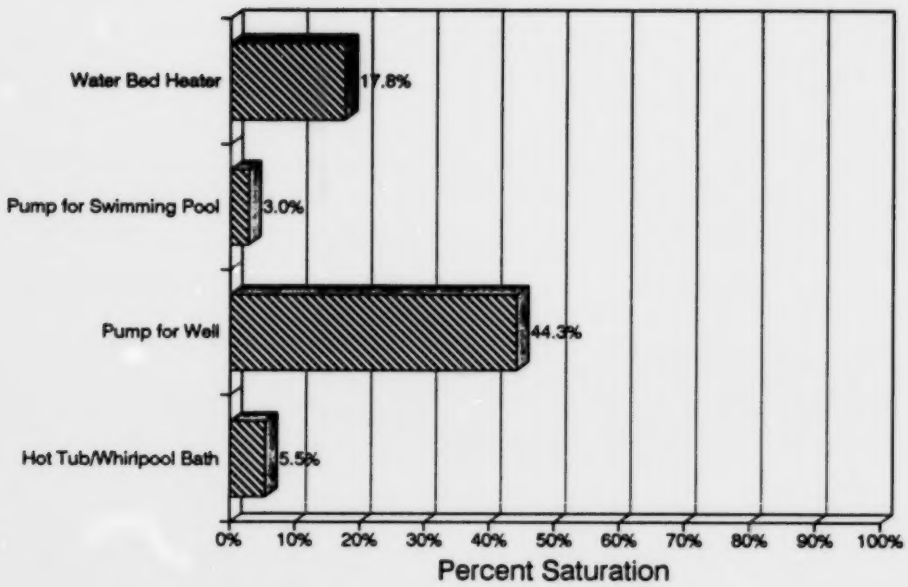
Questions 1-24 Appliance	Number Owning	Total Number of Respondents	Percent Saturation
Automatic Washer	7217	8411	85.8%
Other Electric Washer	626	8411	7.4%
Electric Clothes Dryer	7149	8411	85.0%

Figure 3
Other Appliances - I



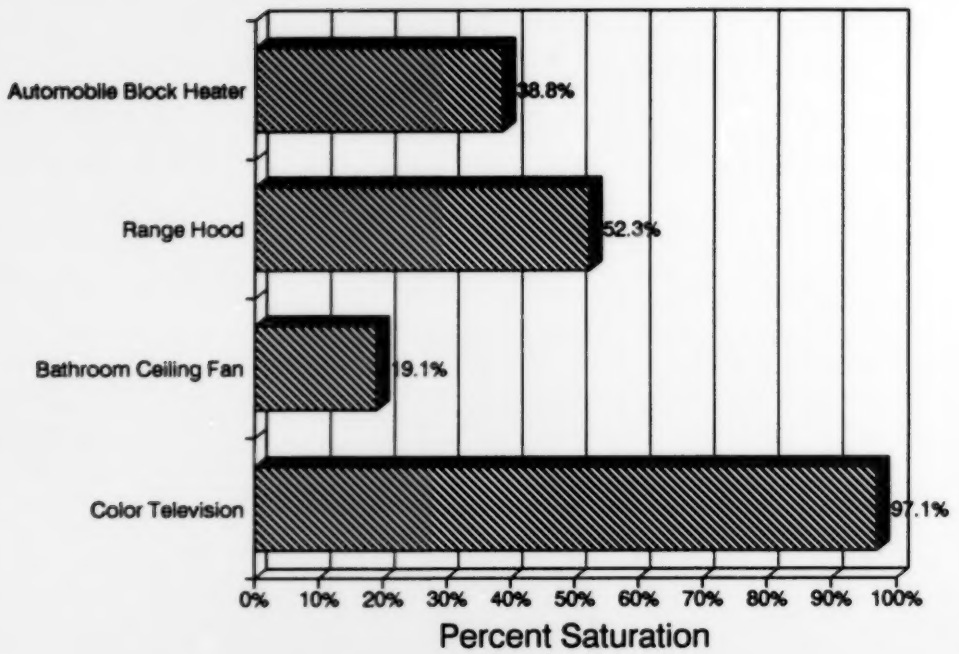
Questions 1-24 Appliance	Number Owning	Total Number of Respondents	Percent Saturation
Air Conditioner	708	8411	8.4%
Dehumidifier	2472	8411	29.4%
Humidifier	1420	8411	16.9%
Heat Exchanger/Recovery System	556	8411	6.6%
Portable Electric Heater	1603	8411	19.1%
Programmable Thermostat	1023	8411	12.2%

Figure 4
Other Appliances II



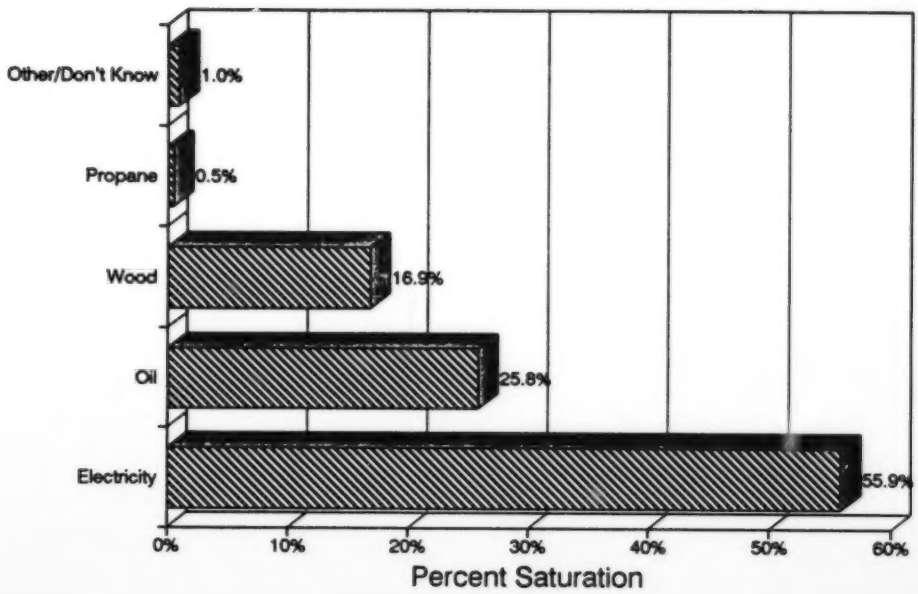
Questions 1-24 Appliance	Number Owned	Total Number of Respondents	Percent Saturation
Hot Tub/Whirlpool Bath	464	8411	5.5%
Pump for Well	3724	8411	44.3%
Pump for Swimming Pool	250	8411	3.0%
Water Bed Heater	1494	8411	17.8%

Figure 5
Other Appliances III



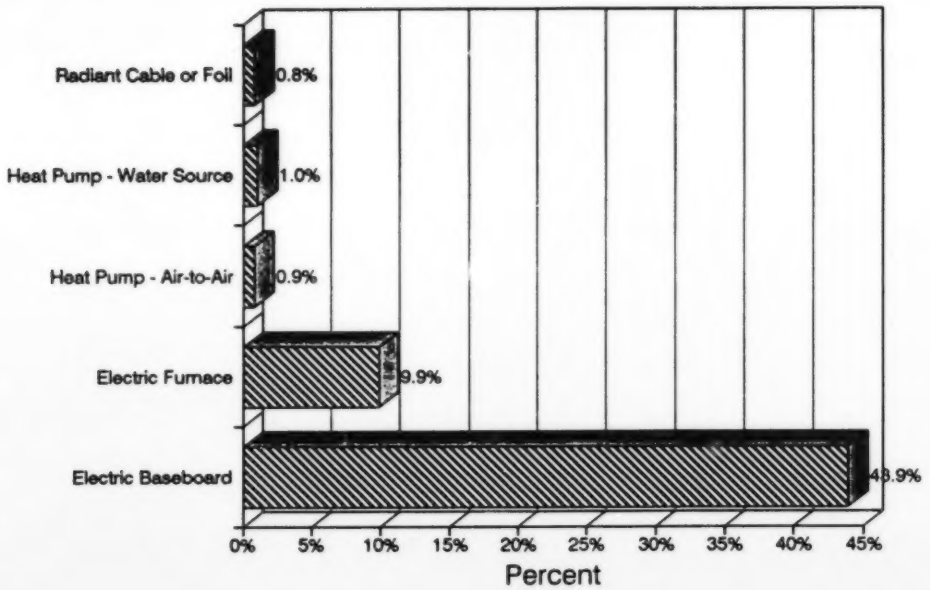
Questions 1-24 Appliance	Number Owned	Total Number of Respondents	Percent Saturation
Color Television	8164	8411	97.1%
Bathroom Ceiling Fan	1603	8411	19.1%
Range Hood	4403	8411	52.3%
Automobile Block Heater	3265	8411	38.8%

Figure 6
Primary Space Heating Energy Source



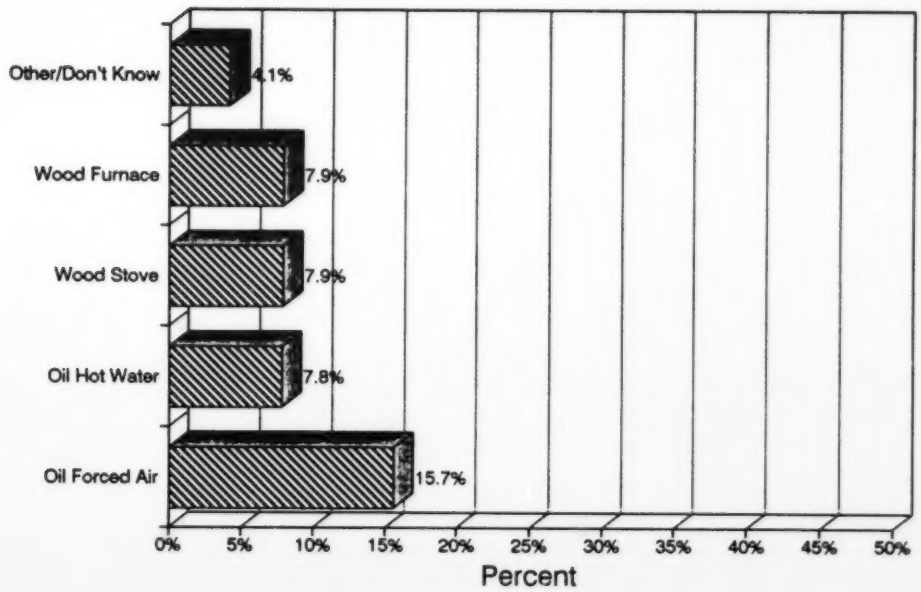
Question 25 Primary Space Heating Source	Number	Total Number of Respondents	Percent Saturation
Electricity	4701	8411	55.9%
Oil	2173	8411	25.8%
Wood	1419	8411	16.9%
Propane	38	8411	0.5%
Other/Don't Know	80	8411	1.0%

Figure 7
Type of Primary Space Heating Equipment - I



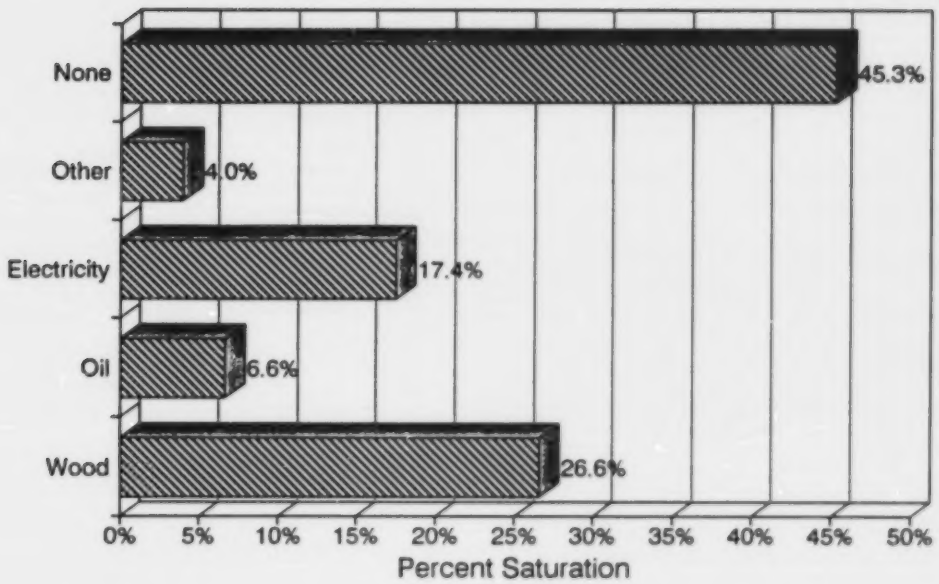
Question 26 Type of Heating Equipment - 1	Number	Total Number of Respondents	Percent Saturation
Electric Baseboard	3695	8411	43.9%
Electric Furnace	836	8411	9.9%
Heat Pump - Air-to-Air	73	8411	0.9%
Heat Pump - Water Source	87	8411	1.0%
Radiant Cable or Foil	69	8411	0.8%

Figure 8
Type of Primary Space Heating Equipment - II



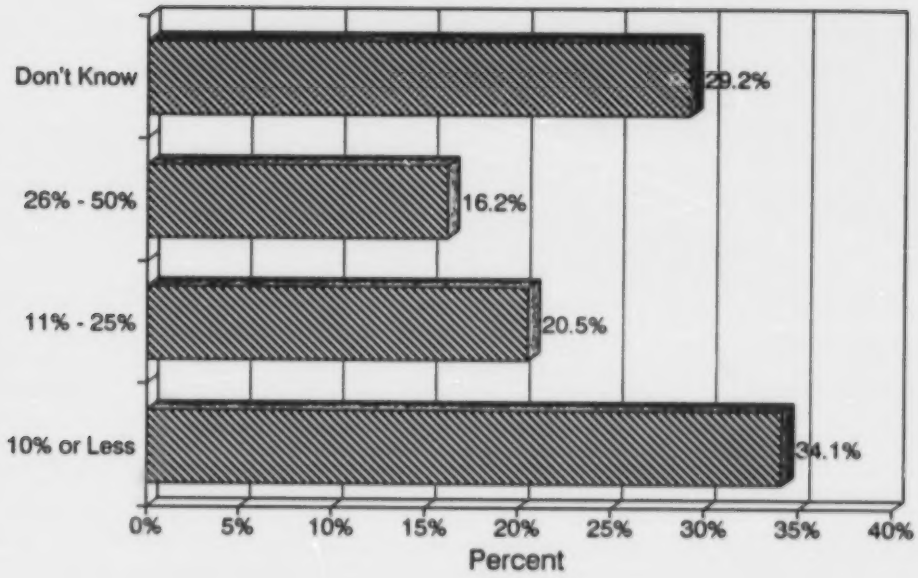
Question 26 Cont'd Type of Heating Equipment - 2	Number	Total Number of Respondents	Percent Saturation
Oil Forced Air	1317	8411	15.7%
Oil Hot Water	656	8411	7.8%
Wood Stove	668	8411	7.9%
Wood Furnace	663	8411	7.9%
Other/Don't Know	347	8411	4.1%

Figure 9
Supplementary Heating Energy Source



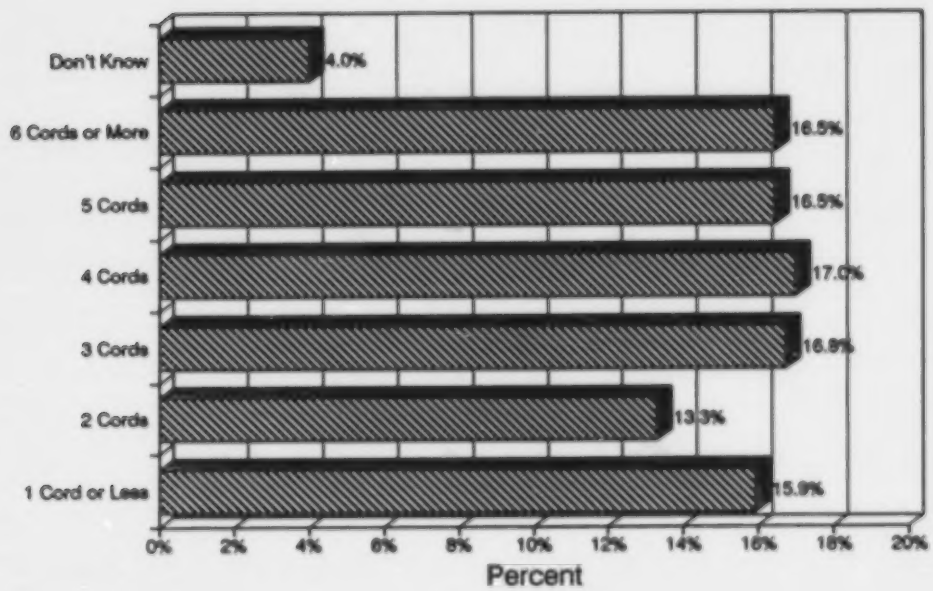
Question 28 Supplementary Heating Source	Number	Total Respondents	Percent
Wood	2240	8411	26.6%
Oil	559	8411	6.6%
Electricity	1466	8411	17.4%
Other	335	8411	4.0%
None	3811	8411	45.3%

Figure 10
Supplementary Heating Share



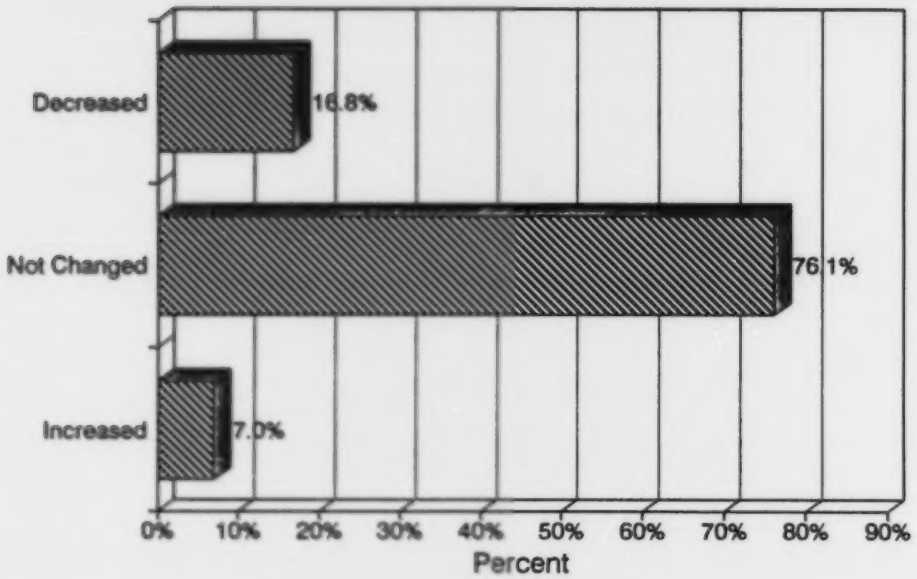
Question 29 Supplementary Heating Share	Number	Total Respondents	Percent
10% or Less	1570	4600	34.1%
11% - 25%	945	4600	20.5%
26% - 50%	744	4600	16.2%
Don't Know	1341	4600	29.2%

Figure 11
Cords of Wood Used Per Year



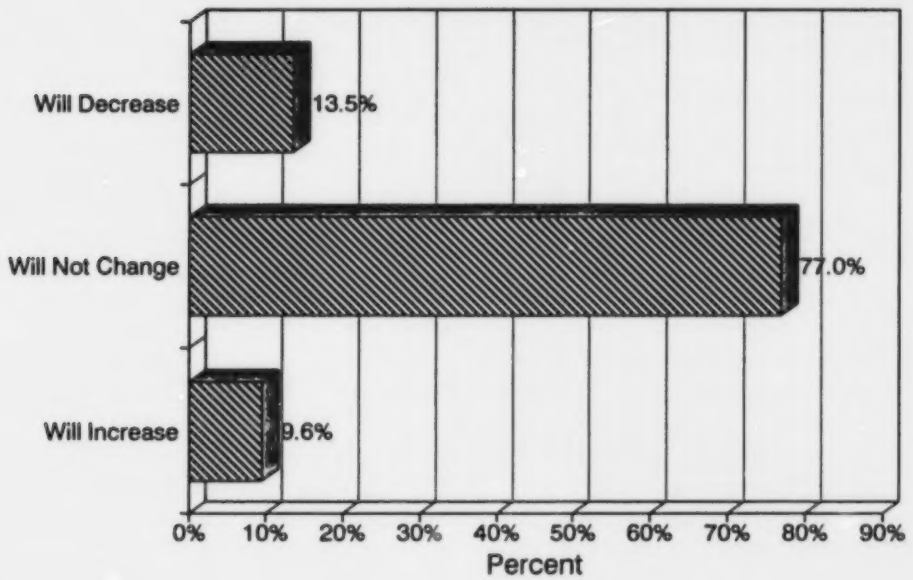
Question 30 Cords of Wood	Number	Total Respondents	Percent
1 Cord or Less	566	3549	15.9%
2 Cords	473	3549	13.3%
3 Cords	595	3549	16.8%
4 Cords	604	3549	17.0%
5 Cords	584	3549	16.5%
6 Cords or More	584	3549	16.5%
Don't Know	143	3549	4.0%

Figure 12
Amount of Wood Burned Annually



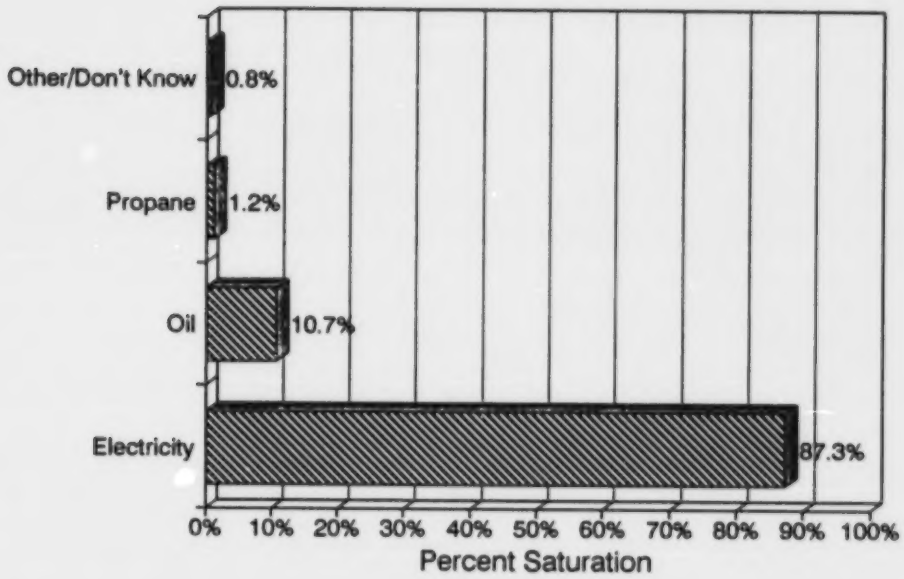
Question 31 Changes in Wood Use - 1	Number	Total Respondents	Percent
Increased	247	3506	7.0%
Not Changed	2669	3506	76.1%
Decreased	590	3506	16.8%

Figure 13
Future Amount of Wood Burned Annually



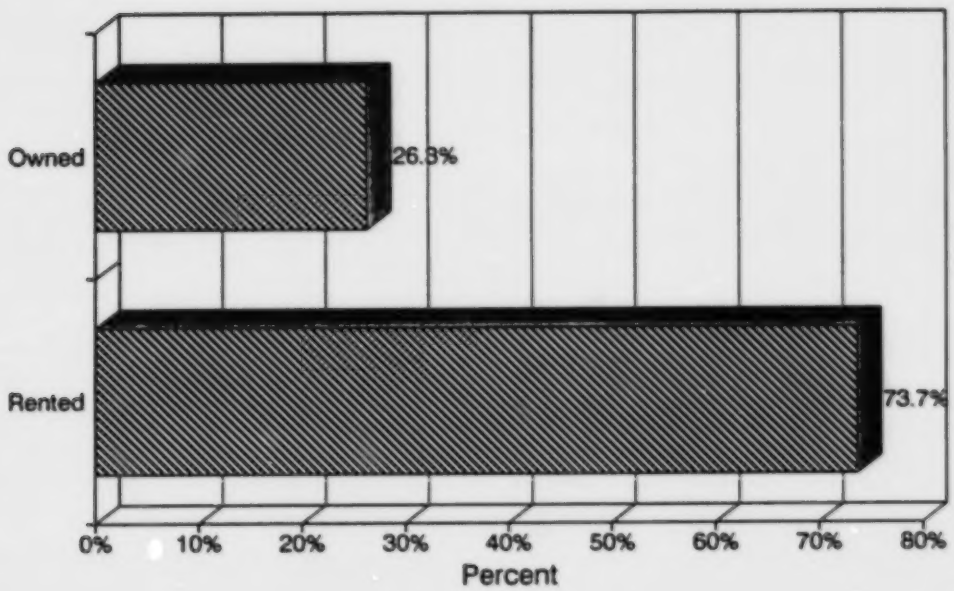
Question 32 Changes in Wood Use - 2	Number	Total Respondents	Percent
Will Increase	334	3494	9.6%
Will Not Change	2690	3494	77.0%
Will Decrease	470	3494	13.5%

Figure 14
Water Heating Energy Source



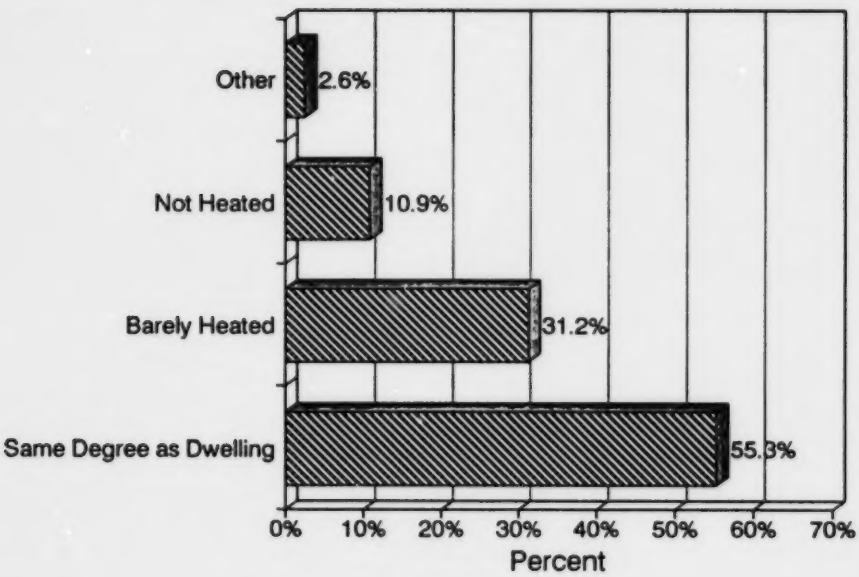
Question 33 Water Heating Energy Source	Number	Total Respondents	Percent
Electricity	7186	8231	87.3%
Oil	882	8231	10.7%
Propane	98	8231	1.2%
Other/Don't Know	65	8231	0.8%

Figure 15
Water Heater Ownership



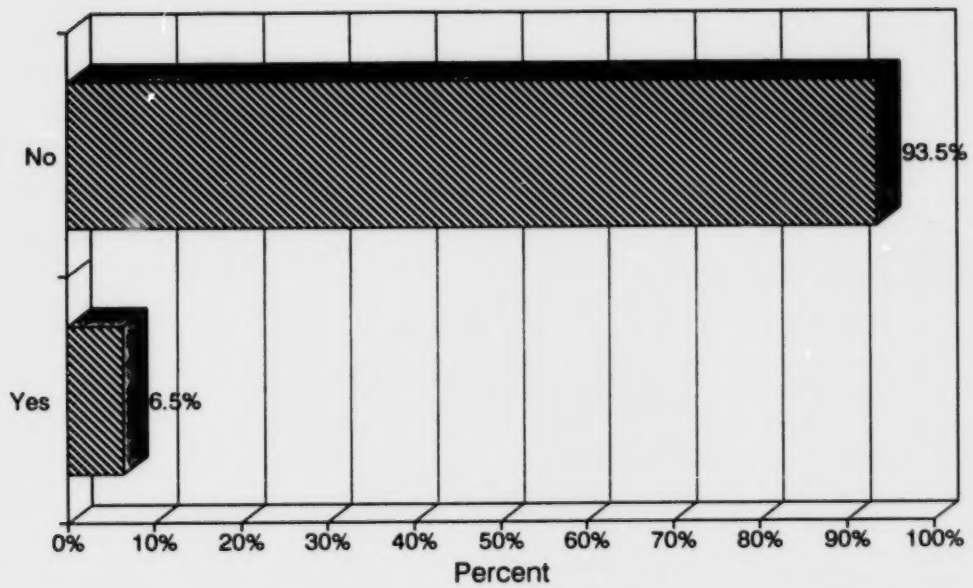
Question 34 Water Heater Ownership	Number	Total Respondents	Percent
Rented	5874	7967	73.7%
Owned	2093	7967	26.3%

Figure 16
Water Heater Area Temperature



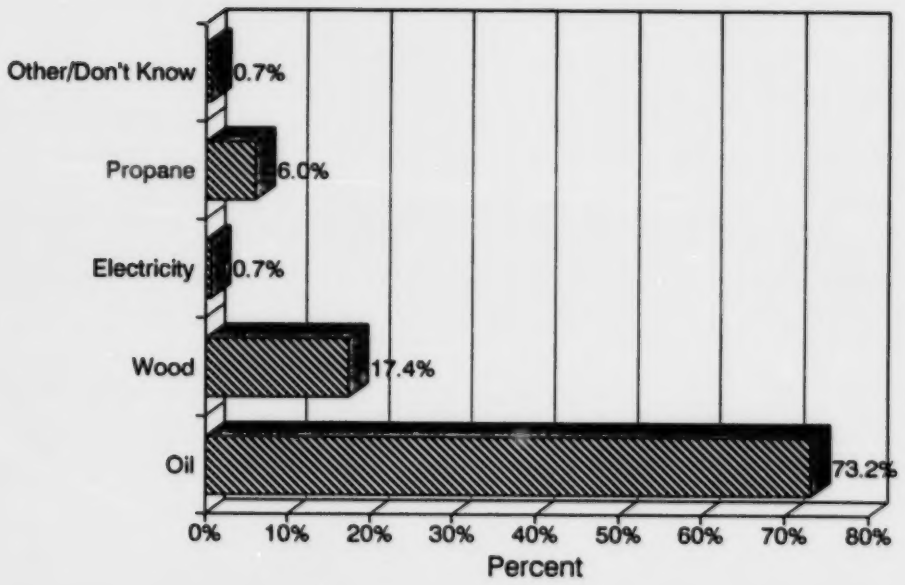
Question 35 Water Heater Area Temperature	Number	Total Respondents	Percent
Same Degree as Dwelling	4367	7896	55.3%
Barely Heated	2465	7896	31.2%
Not Heated	857	7896	10.9%
Other	207	7896	2.6%

Figure 17
Energy Conversion in Past 2 Years



Question 36 Energy Conversion	Number	Total Respondents	Percent
Yes	545	8411	6.5%
No	7866	8411	93.5%

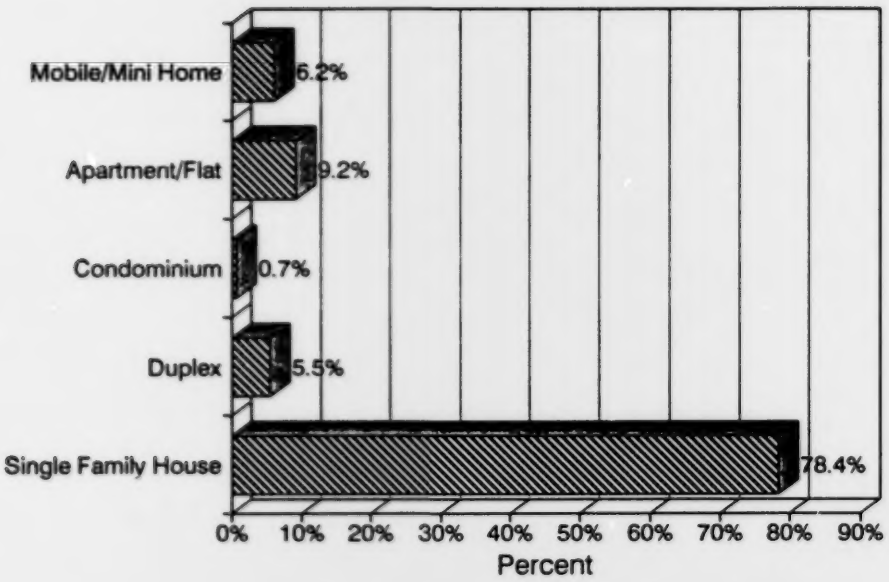
Figure 18
Previous Heating Energy Source*



Question 37 Previous Heating Energy Source	Total Number	Respondents	Percent
Oil	327	447	73.2%
Wood	78	447	17.4%
Electricity	3	447	0.7%
Propane	27	447	6.0%
Other/Don't Know	3	447	0.7%

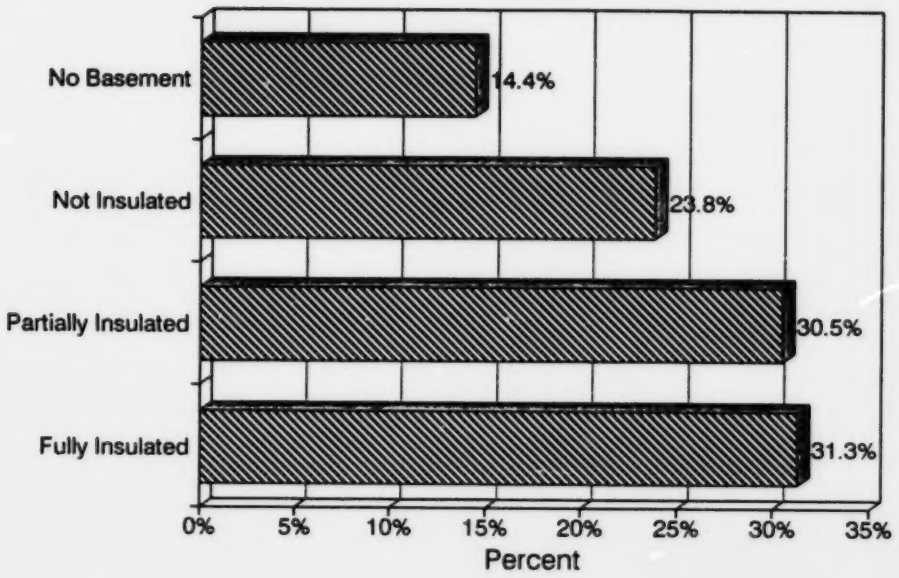
* For conversions in last 2 years.

Figure 19
Type of Dwelling



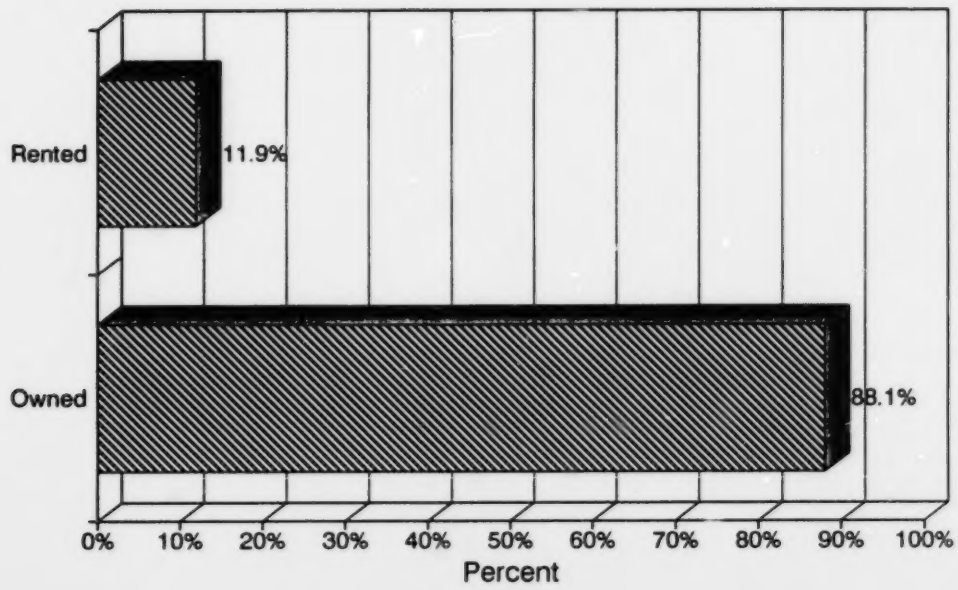
Question 38 Type of Dwelling	Number	Total Respondents	Percent
Single Family House	6402	8166	78.4%
Duplex	448	8166	5.5%
Condominium	57	8166	0.7%
Apartment/Flat	755	8166	9.2%
Mobile/Mini Home	504	8166	6.2%

Figure 20
Basement Insulation



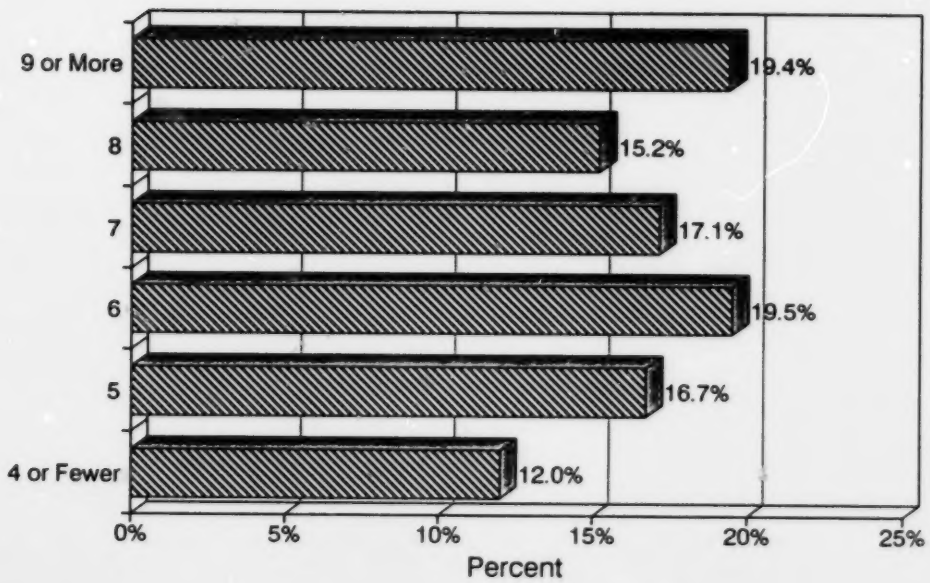
Question 39 Basement Insulation	Number	Total Respondents	Percent
Fully Insulated	2479	7920	31.3%
Partially Insulated	2416	7920	30.5%
Not Insulated	1886	7920	23.8%
No Basement	1139	7920	14.4%

Figure 21
Home Ownership



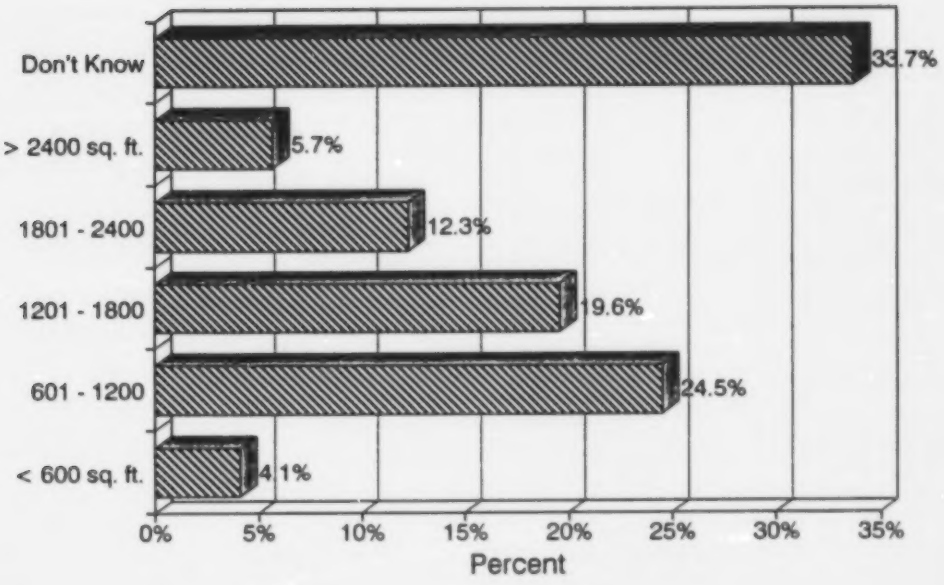
Question 40 Home Ownership	Number	Total Respondents	Percent
Owned	7117	8079	88.1%
Rented	962	8079	11.9%

Figure 22
Number of Finished Rooms



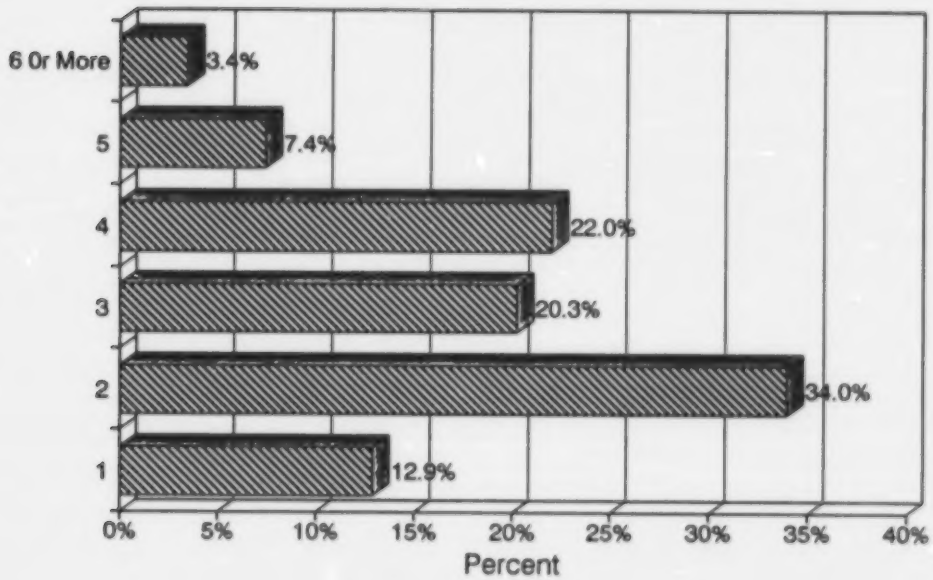
Question 41 Number of Finished Rooms	Total Number	Respondents	Percent
4 or Fewer	974	8102	12.0%
5	1356	8102	16.7%
6	1579	8102	19.5%
7	1389	8102	17.1%
8	1233	8102	15.2%
9 or More	1571	8102	19.4%

Figure 23
Finished Area of Home



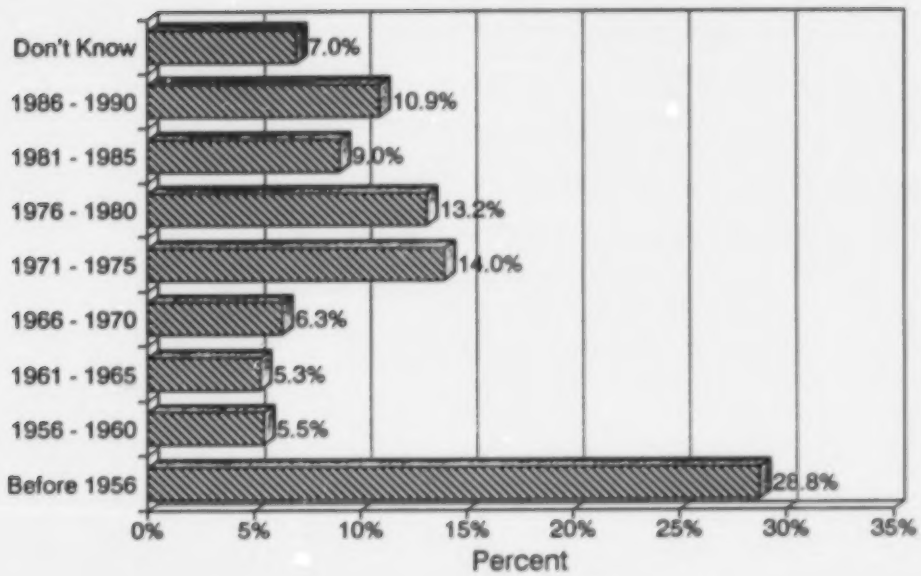
Question 42 Finished Area of Home	Number	Total Respondents	Percent
< 600 sq. ft.	345	8357	4.1%
601 - 1200	2051	8357	24.5%
1201 - 1800	1639	8357	19.6%
1801 - 2400	1026	8357	12.3%
> 2400 sq. ft.	477	8357	5.7%
Don't Know	2819	8357	33.7%

Figure 24
Number of Persons in Household



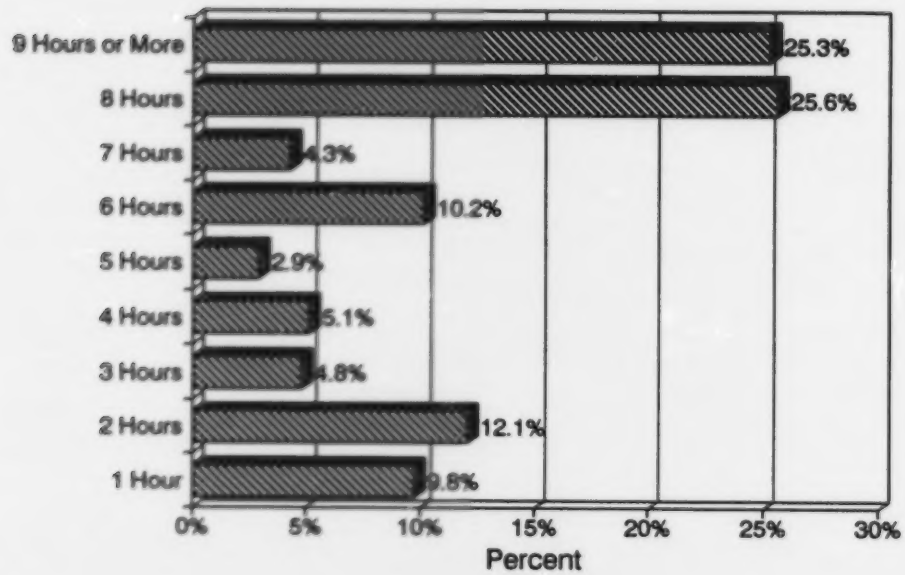
Question 43 People per Household	Number	Total Respondents	Percent
1	1055	8177	12.9%
2	2777	8177	34.0%
3	1656	8177	20.3%
4	1799	8177	22.0%
5	608	8177	7.4%
6 Or More	282	8177	3.4%

Figure 25
Age of Dwelling



Question 44 Age of Dwelling	Number	Total Respondents	Percent
Before 1956	2311	8036	28.8%
1956 - 1960	441	8036	5.5%
1961 - 1965	429	8036	5.3%
1966 - 1970	508	8036	6.3%
1971 - 1975	1123	8036	14.0%
1976 - 1980	1058	8036	13.2%
1981 - 1985	725	8036	9.0%
1986 - 1990	879	8036	10.9%

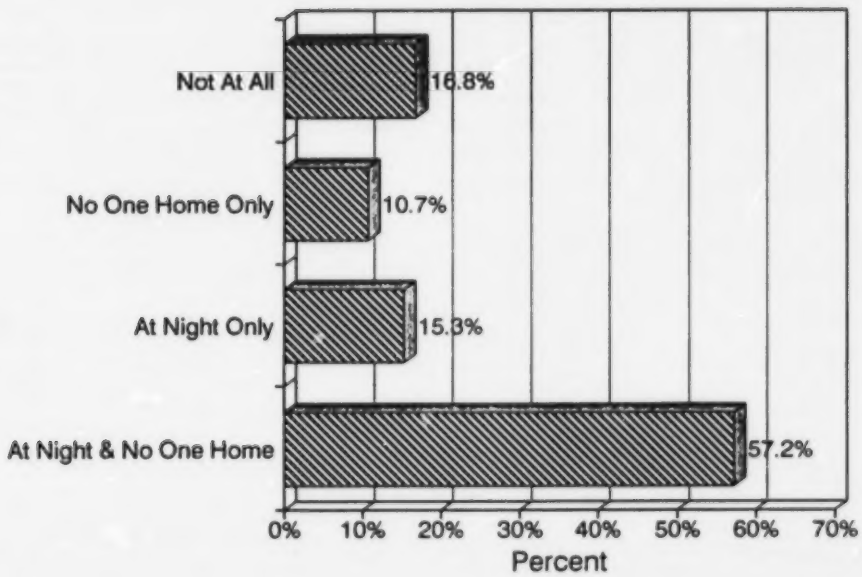
Figure 26
Automobile Block Heater Use*



Question 45 Hours of Use	Number	Total Respondents	Percent
1 Hour	275	2816	9.8%
2 Hours	340	2816	12.1%
3 Hours	135	2816	4.8%
4 Hours	144	2816	5.1%
5 Hours	82	2816	2.9%
6 Hours	286	2816	10.2%
7 Hours	121	2816	4.3%
8 Hours	721	2816	25.6%
9 Hours or More	712	2816	25.3%

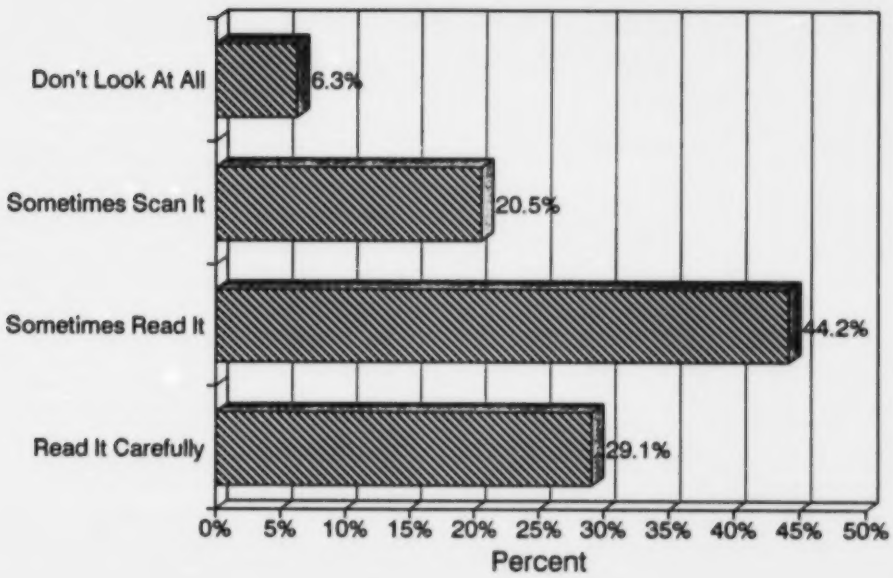
* While only 1430 people indicated ownership of a block heater, 2819 responded to the question on hours of use (see Figure 5).

Figure 27
Manual Thermostat Set-Back



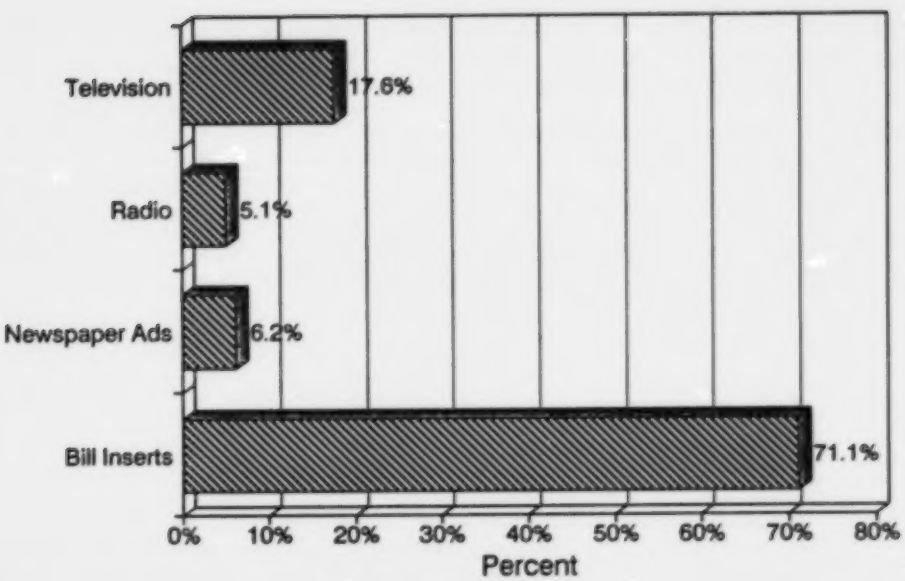
Question 46 When Thermostat Set Back	Number	Total Respondents	Percent
At Night & No One Home	4183	7311	57.2%
At Night Only	1119	7311	15.3%
No One Home Only	783	7311	10.7%
Not At All	1226	7311	16.8%

Figure 28
Reading of Bill Insert



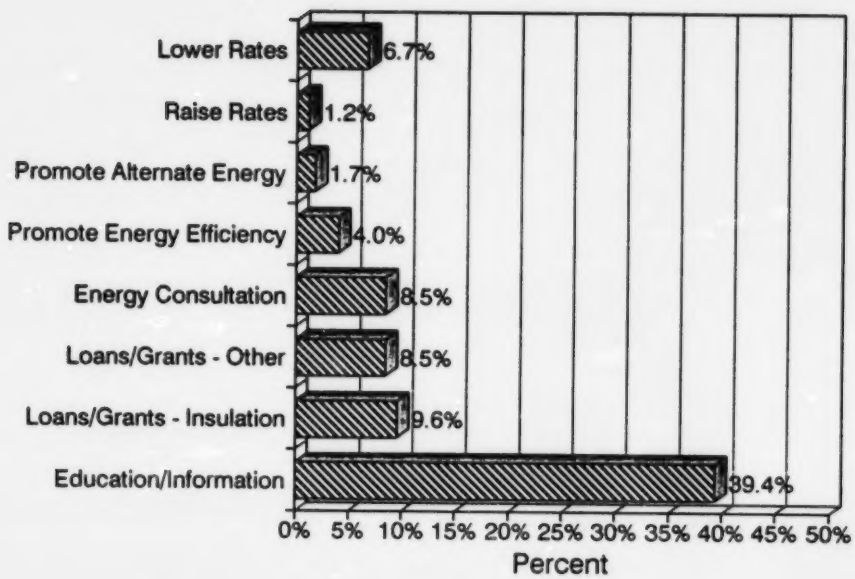
Question 47 Frequency of Reading	Number	Total Respondents	Percent
Read It Carefully	2362	8120	29.1%
Sometimes Read It	3586	8120	44.2%
Sometimes Scan It	1662	8120	20.5%
Don't Look At All	510	8120	6.3%

Figure 29
Customer Communication



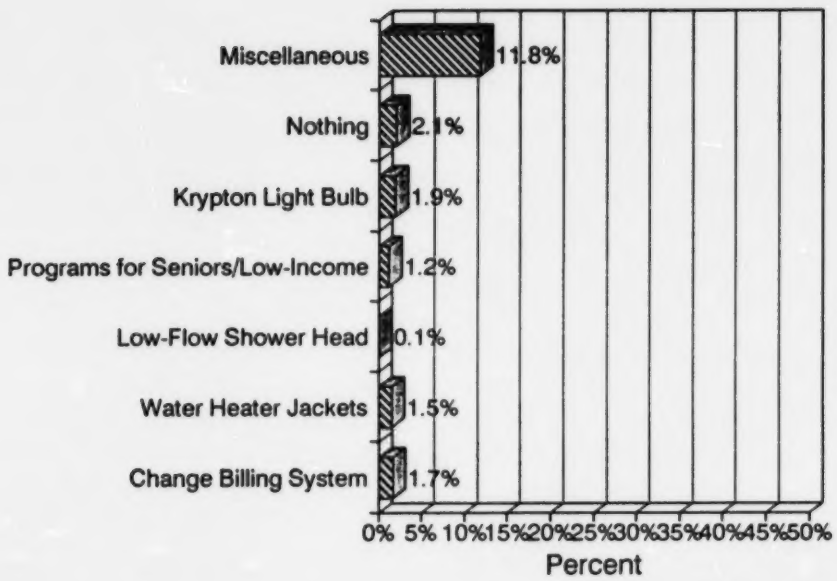
Question 48 Best Way To Communicate	Number	Total Respondents	Percent
Bill Inserts	5627	7910	71.1%
Newspaper Ads	488	7910	6.2%
Radio	403	7910	5.1%
Television	1392	7910	17.6%

Figure 30
Energy Conservation Comments I



Question 49 Comment	Total Number	Total Respondents	Percent
Education/Information	1200	3042	39.4%
Loans/Grants - Insulation	291	3042	9.6%
Loans/Grants - Other	259	3042	8.5%
Energy Consultation	259	3042	8.5%
Promote Energy Efficiency	123	3042	4.0%
Promote Alternate Energy	53	3042	1.7%
Raise Rates	36	3042	1.2%
Lower Rates	203	3042	6.7%

Figure 31
Energy Conservation Comments II



Question 49 Cont'd Comment	Number	Total Respondents	Percent
Change Billing System	51	3042	1.7%
Water Heater Jackets	47	3042	1.5%
Low-Flow Shower Head	3	3042	0.1%
Programs for Seniors/Low-Income	36	3042	1.2%
Krypton Light Bulb	58	3042	1.9%
Nothing	65	3042	2.1%
Miscellaneous	358	3042	11.8%

3.2 SELECTED CROSS-TABULATIONS

The following 12 tables cross-tabulate a number of the questions. The first 3 show by geographical area the choice of energy sources. They give the percentage of respondents using each type of energy for space, water, and supplementary heating for each of NB Power's 15 districts plus Saint John.

The next 7 tables show by principal space heating energy source the choice of other energies, dwelling characteristics, and type of heating system.

The last table shows the penetration of selected appliances by annual energy consumption level.

NB POWER

1990 ENERGY APPLICATION SURVEY

TABLE 1

ENERGY SOURCE FOR HOME HEATING

DISTRICT	ELECTRICITY	OIL	WOOD	OTHER/ DON'T KNOW	DISTRICT TOTAL
	(Percent (%) of Respondents)				
FREDERICTON	56.5	26.8	14.8	1.9	100.0
WOODSTOCK	41.5	25.1	32.5	0.8	100.0
GRAND FALLS	50.0	19.8	28.9	1.2	100.0
ST. STEPHEN	54.3	27.7	17.0	0.9	100.0
ROTHESAY	70.3	15.6	12.4	1.7	100.0
SUSSEX	43.9	20.6	34.4	1.2	100.0
CHATHAM	49.2	29.3	20.2	1.2	100.0
DALHOUSIE	49.7	29.5	19.7	1.0	100.0
BATHURST	62.6	21.1	16.1	0.2	100.0
CAMPBELLTON	50.7	28.1	19.9	1.4	100.0
TRACADIE	64.8	10.1	24.0	1.1	100.0
MONCTON	57.5	32.9	8.5	1.1	100.0
BOUCTOUCHE	51.2	16.1	31.6	1.1	100.0
SHEDIAC	65.3	14.9	19.1	0.8	100.0
SACKVILLE	32.0	36.0	30.0	1.7	100.0
TOTAL NB POWER	**55.5**	**24.5**	**18.9**	**1.1**	**100.0**
SAINT JOHN	58.9	36.6	1.8	2.7	100.0
TOTAL NEW BRUNSWICK	**55.9**	**25.8**	**16.9**	**1.4**	**100.0**

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1990 ENERGY APPLICATION SURVEY

TABLE 2

ENERGY SOURCE FOR SUPPLEMENTARY HEATING

DISTRICT	ELECTRICITY	OIL	WOOD	OTHER	NONE	DISTRICT TOTAL
	(Percent (%) of Respondents)					
FREDERICTON	15.4	5.3	24.5	2.4	52.4	100.0
WOODSTOCK	20.6	15.9	28.8	3.5	31.2	100.0
GRAND FALLS	25.8	8.3	34.5	0.6	30.8	100.0
ST. STEPHEN	17.7	8.6	27.0	7.1	39.6	100.0
ROTHESAY	12.7	3.9	39.9	6.5	37.0	100.0
SUSSEX	25.4	7.3	26.5	7.5	33.3	100.0
CHATHAM	15.1	9.7	30.8	4.5	39.9	100.0
DALHOUSIE	19.2	10.9	27.5	2.5	39.9	100.0
BATHURST	17.2	4.8	26.6	3.0	48.4	100.0
CAMPBELLTON	19.9	7.5	20.5	2.8	49.3	100.0
TRACADIE	23.4	5.7	32.6	3.2	35.1	100.0
MONCTON	16.6	5.0	21.2	3.6	53.6	100.0
BOUCTOUCHE	18.6	9.5	33.3	4.2	34.4	100.0
SHEDIAC	17.6	6.9	29.0	6.4	40.1	100.0
SACKVILLE	21.1	15.4	30.9	5.1	27.5	100.0
TOTAL NB POWER	**18.1**	**7.1**	**27.9**	**16.0**	**30.9**	**100.0**
SAINT JOHN	12.3	3.2	16.3	4.8	63.4	100.0
TOTAL NEW BRUNSWICK	**17.4**	**6.6**	**26.6**	**4.1**	**45.3**	**100.0**

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1990 ENERGY APPLICATION SURVEY

TABLE 3

ENERGY SOURCE FOR WATER HEATING

DISTRICT	ELECTRICITY	OIL	PROPANE	OTHER	DISTRICT TOTAL
	(Percent (%) of Respondents)				
FREDERICTON	87.7	10.1	1.3	0.9	100.0
WOODSTOCK	88.2	9.9	0.8	1.1	100.0
GRAND FALLS	88.4	10.3	0.2	1.1	100.0
ST. STEPHEN	92.2	5.9	1.6	0.2	100.0
ROTHESAY	92.3	5.1	1.4	1.2	100.0
SUSSEX	92.3	4.0	1.4	2.3	100.0
CHATHAM	89.8	7.6	1.9	0.6	100.0
DALHOUSIE	83.2	14.1	1.0	1.6	100.0
BATHURST	94.3	4.5	0.5	0.7	100.0
CAMPBELLTON	78.3	21.7	0.0	0.0	100.0
TRACADIE	94.5	4.6	0.7	0.2	100.0
MONCTON	82.8	15.1	1.4	0.6	100.0
BOUCTOUCHE	94.0	4.3	1.1	0.7	100.0
SHEDIAC	91.9	7.0	0.8	0.4	100.0
SACKVILLE	74.1	22.4	1.7	1.7	100.0
TOTAL NB POWER	**88.4**	**9.6**	**1.1**	**0.8**	**100.0**
SAINT JOHN	78.2	20.0	1.4	0.3	100.0
TOTAL NEW BRUNSWICK	**87.3**	**10.7**	**1.2**	**0.8**	**100.0**

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1990 ENERGY APPLICATION SURVEY

TABLE 4

SOURCE OF SUPPLEMENTARY HEATING BY PRINCIPAL HEATING SOURCE

PRINCIPAL SPACE HEATING SOURCE	SOURCE OF SUPPLEMENTARY HEATING					
	ELECTRICITY	OIL	WOOD	OTHER/DON'T KNOW	NONE	TOTAL
	(Percent (%) of Respondents)					
ELECTRICITY	0.0	1.3	30.8	4.9	63.0	100.0
OIL	16.8	0.0	25.2	3.5	54.5	100.0
WOOD	45.1	24.2	0.0	1.2	29.5	100.0

TABLE 5

SOURCE OF WATER HEATING BY PRINCIPAL SPACE HEATING SOURCE

PRINCIPAL SPACE HEATING SOURCE	SOURCE OF WATER HEATING			
	ELECTRICITY	OIL	OTHER/DON'T KNOW	TOTAL
	(Percent (%) of Respondents)			
ELECTRICITY	96.1	1.0	2.9	100.0
OIL	63.0	33.5	3.5	100.0
WOOD	87.5	6.8	5.7	100.0

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1990 ENERGY APPLICATION SURVEY

TABLE 6

TYPE OF DWELLING BY PRINCIPAL SPACE HEATING SOURCE

PRINCIPAL SPACE HEATING SOURCE	TYPE OF DWELLING: SINGLE FAMILY	DUPLEX	APT/ FLAT	MOBILE HOME	DON'T KNOW	TOTAL
	(Percent (%) of Respondents)					
ELECTRICITY	72.6	5.3	11.6	7.8	2.7	100.0
OIL	73.9	7.4	10.3	4.6	3.8	100.0
WOOD	92.8	2.4	0.6	2.4	1.8	100.0

TABLE 7

AGE OF DWELLING BY PRINCIPAL SPACE HEATING SOURCE

PRINCIPAL SPACE HEATING SOURCE	YEAR DWELLING BUILT: BEFORE 1956	1956-1965	1966-1975	1976-1985	AFTER 1985	DON'T KNOW
	(Percent (%) of Respondents)					
ELECTRICITY	18.3	9.0	20.0	25.5	16.1	11.1
OIL	45.3	15.0	19.1	7.0	0.4	13.2
WOOD	31.1	7.3	18.5	29.4	7.3	6.4

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1990 ENERGY APPLICATION SURVEY

TABLE 8

TYPE OF HEATING SYSTEM BY PRINCIPAL SPACE HEATING SOURCE

PRINCIPAL SPACE HEATING SOURCE	TYPE OF HEATING SYSTEM: ELECTRIC BASEBOARD	ELECTRIC FURNACE	OTHER/ DON'T KNOW
ELECTRICITY	76.1%	15.7%	8.2%

	OIL FORCED AIR	OIL FORCED WATER	OTHER/ DON'T KNOW
OIL	58.1%	28.2%	13.7%

	STOVE	FURNACE	OTHER/ DON'T KNOW
WOOD	40.9%	45.2%	13.9%

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1990 ENERGY APPLICATION SURVEY

TABLE 9

PRINCIPAL SPACE HEATING SOURCE BY TYPE OF DWELLING

TYPE OF DWELLING	PRINCIPAL SPACE HEATING SOURCE			
	ELECTRICITY	OIL	WOOD	OTHER/ DON'T KNOW
	(Percent (%) of Respondents)			
SINGLE FAMILY	53.3	25.1	20.6	1.0
DUPLEX	55.8	35.9	7.6	0.7
APT/FLAT/CONDO	67.5	27.7	1.0	3.8
MOBILE HOME	72.6	19.8	6.7	0.9

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1990 ENERGY APPLICATION SURVEY

TABLE 10

PRINCIPAL SPACE HEATING SOURCE BY AGE OF DWELLING

YEAR DWELLING BUILT	PRINCIPAL SPACE HEATING SOURCE				
	ELECTRICITY	OIL	WOOD	OTHER/DON'T KNOW	TOTAL
	(Percent (%) of Respondents)				
BEFORE 1956	37.3	42.6	19.1	1.0	100.0
1956-1960	44.9	39.7	13.2	2.2	100.0
1961-1965	52.9	35.2	10.7	1.2	100.0
1966-1970	52.6	31.3	15.0	1.1	100.0
1971-1975	59.7	22.9	16.6	0.8	100.0
1976-1980	64.3	12.3	22.7	0.7	100.0
1981-1985	71.4	2.9	24.4	1.3	100.0
AFTER 1985	86.3	0.9	11.8	1.0	100.0
DON'T KNOW	55.6	30.7	9.6	4.1	100.0

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1990 ENERGY APPLICATION SURVEY

TABLE 11

HEATING SYSTEM CONVERSION IN THE LAST 2 YEARS BY AGE OF DWELLING

YEAR DWELLING BUILT	CONVERTED IN LAST TWO YEARS	
	YES	NO
	(Percent (%) of Respondents)	
BEFORE 1956	8.6	92.4
1956-1960	7.5	92.5
1961-1965	11.4	88.6
1966-1970	9.4	90.6
1971-1975	6.7	93.3
1976-1980	4.3	95.7
1981-1985	2.9	97.1
AFTER 1985	3.5	96.5
DON'T KNOW	4.8	95.2

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TABLE 12

APPLIANCE SATURATION LEVELS BY ANNUAL CONSUMPTION (KWh) BLOCKS

ELECTRICAL APPLIANCE	UNDER 5,000	5,000-9,999	10,000-14,999	15,000-19,999	20,000-24,999	OVER 25,000
	(Percent (%) of Respondents)					
SPACE HEATING	14.2	17.4	26.5	55.7	78.2	92.1
WATER HEATING	44.3	67.5	87.6	94.3	96.8	96.1
ELECTRIC RANGE	84.5	94.5	95.9	97.1	96.8	97.4
MICROWAVE OVEN	51.7	65.9	75.8	79.9	79.2	83.7
FROST FREE REF.	56.3	73.9	80.6	80.5	83.3	87.5
SEPARATE FREEZER	51.5	68.6	79.3	74.9	74.7	77.7
DISHWASHER	15.2	26.0	38.5	38.6	41.9	58.6
CLOTHES WASHER	56.8	78.4	91.1	90.9	92.8	95.8
CLOTHES DRYER	55.9	77.1	90.4	89.9	92.6	94.4

3.3 ANNUAL CONSUMPTION

The next 5 tables show the average annual consumption by type of household with various combinations of space heating, water heating, and supplementary heating. The households in these samples were drawn from those respondents who had 12 months of consumption history, and who responded to the three questions on heating energy sources.

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TABLE 13

AVERAGE ANNUAL KWh CONSUMPTION

SPACE HEATING:	ELECTRIC
SUPPLEMENTARY HEATING:	NONE
WATER HEATING:	ELECTRIC

TYPE OF DWELLING	AVERAGE ANNUAL USE (KWh)	NUMBER IN SAMPLE
SINGLE FAMILY	28,258	1,094
DUPLEX	21,602	86*
APT/FLAT/CONDOMINIUM	11,534	237
MOBILE/MINI HOME	19,490	152
OVERALL AVERAGE	24,518	1,569

* Results are likely to be unrepresentative due to small sample size.

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TABLE 14

AVERAGE ANNUAL KWh CONSUMPTION

SPACE HEATING:	ELECTRIC
SUPPLEMENTARY HEATING:	YES
WATER HEATING:	ELECTRIC

TYPE OF DWELLING	AVERAGE ANNUAL USE (KWh)	NUMBER IN SAMPLE
SINGLE FAMILY	24,571	1,402
DUPLEX	23,869	58*
APT/FLAT/CONDOMINIUM	13,734	49*
MOBILE/MINI HOME	19,523	97*
OVERALL AVERAGE	23,910	1,606

* Results are likely to be unrepresentative due to small sample size.

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TABLE 15

AVERAGE ANNUAL KWh CONSUMPTION

SPACE HEATING:	NON-ELECTRIC
SUPPLEMENTARY HEATING:	ELECTRIC
WATER HEATING:	ELECTRIC

TYPE OF DWELLING	AVERAGE ANNUAL USE (KWh)	NUMBER IN SAMPLE
SINGLE FAMILY	16,449	702
DUPLEX	14,598	18*
APT/FLAT/CONDOMINIUM	11,600	11*
MOBILE/MINI HOME	13,355	22*
OVERALL AVERAGE	16,262	753

* Results are likely to be unrepresentative due to small sample size.

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1990 ENERGY APPLICATION SURVEY

TABLE 16

AVERAGE ANNUAL KWh CONSUMPTION

SPACE HEATING:	NON-ELECTRIC
SUPPLEMENTARY HEATING:	NON-ELECTRIC
WATER HEATING:	ELECTRIC

TYPE OF DWELLING	AVERAGE ANNUAL USE (KWh)	NUMBER IN SAMPLE
SINGLE FAMILY	11,595	1,327
DUPLEX	11,095	94*
APT/FLAT/CONDOMINIUM	6,852	62*
MOBILE/MINI HOME	10,854	93*
OVERALL AVERAGE	11,335	1,576

* Results are likely to be unrepresentative due to small sample size.

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1990 ENERGY APPLICATION SURVEY

TABLE 17

AVERAGE ANNUAL KWh CONSUMPTION

SPACE HEATING:	NON-ELECTRIC
SUPPLEMENTARY HEATING:	NON-ELECTRIC
WATER HEATING:	NON-ELECTRIC

TYPE OF DWELLING	AVERAGE ANNUAL USE (KWh)	NUMBER IN SAMPLE
SINGLE FAMILY	7,977	580
DUPLEX	5,505	40*
APT/FLAT/CONDOMINIUM	4,008	115
MOBILE/MINI HOME	10,500	3*
OVERALL AVERAGE	7,235	738

* Results are likely to be unrepresentative due to small sample size.

3.4 APPLIANCE SATURATION TRENDS

The following 4 graphs present the saturations taken from the various surveys since 1968 for selected appliances.

Figure 32
PRINCIPAL SPACE HEATING ENERGY

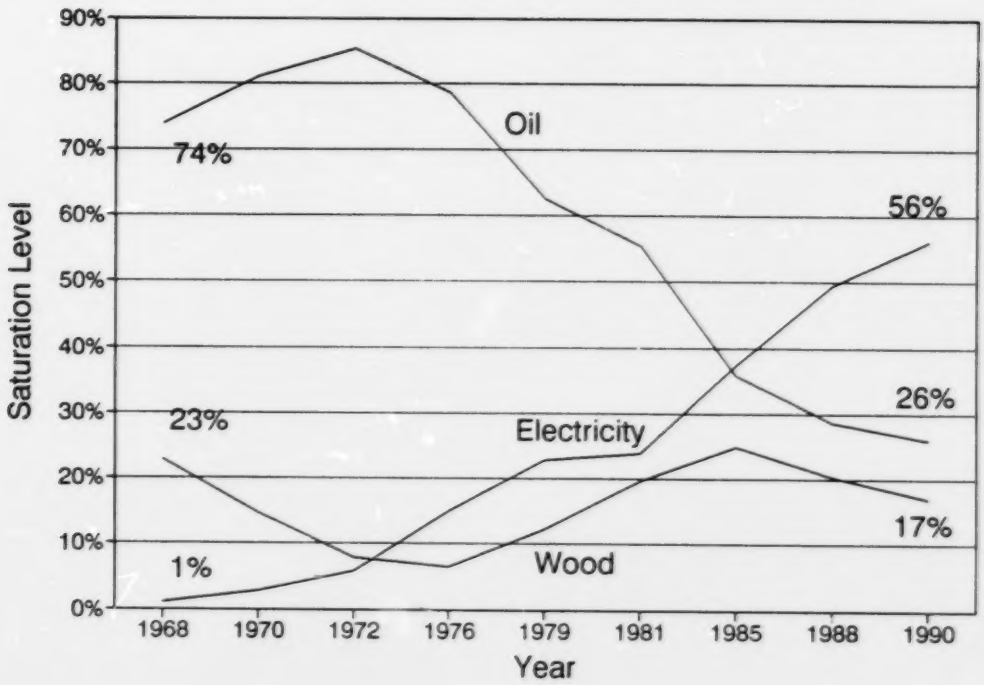


Figure 33
WATER HEATING ENERGY

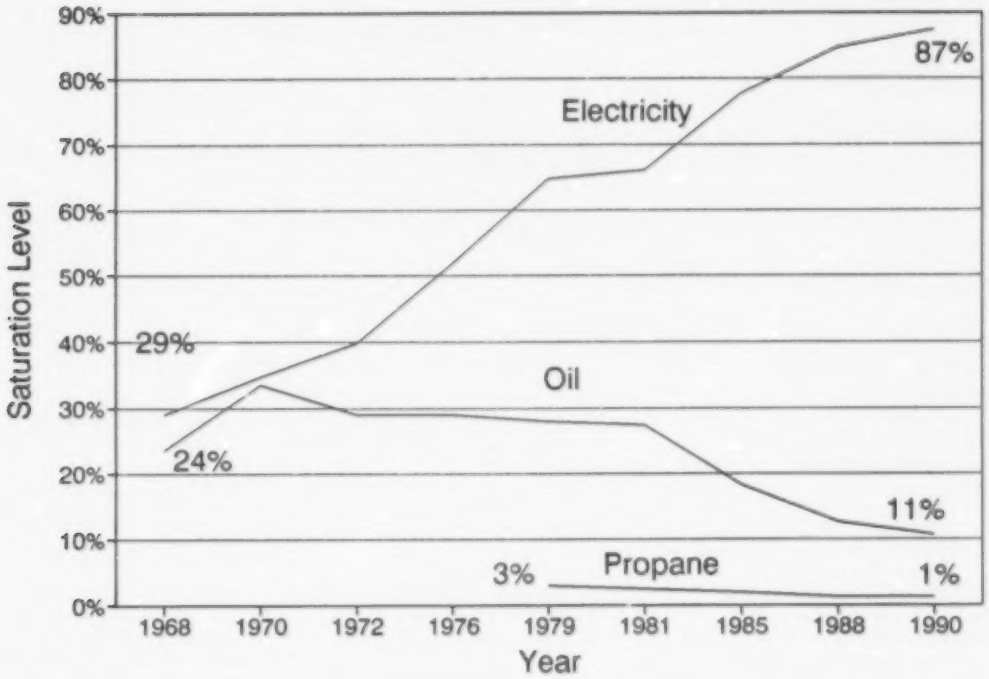


Figure 34
KITCHEN APPLIANCES

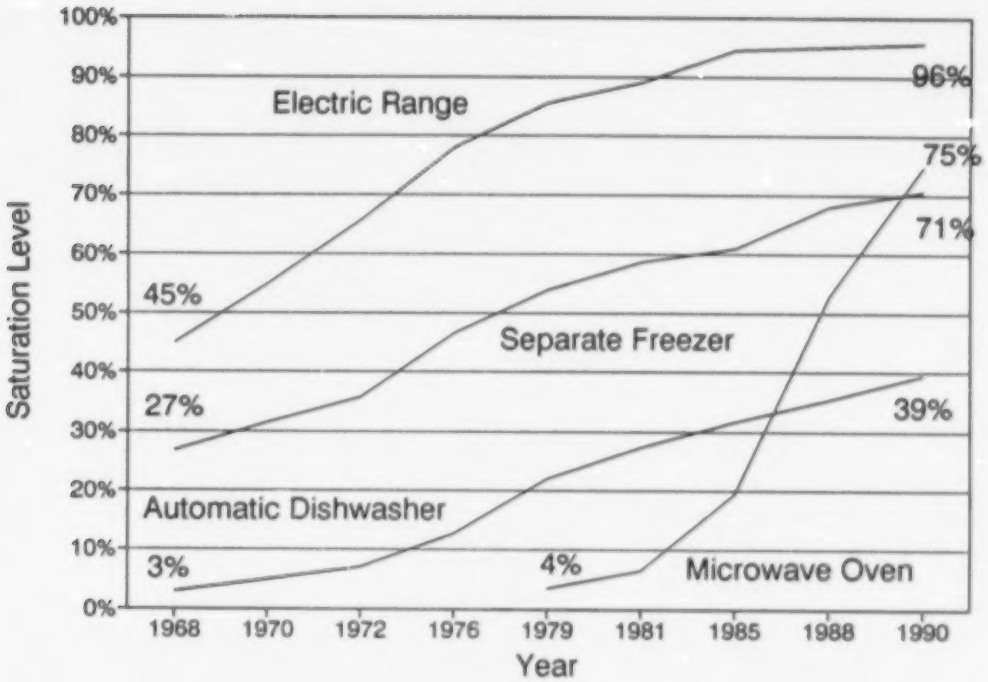
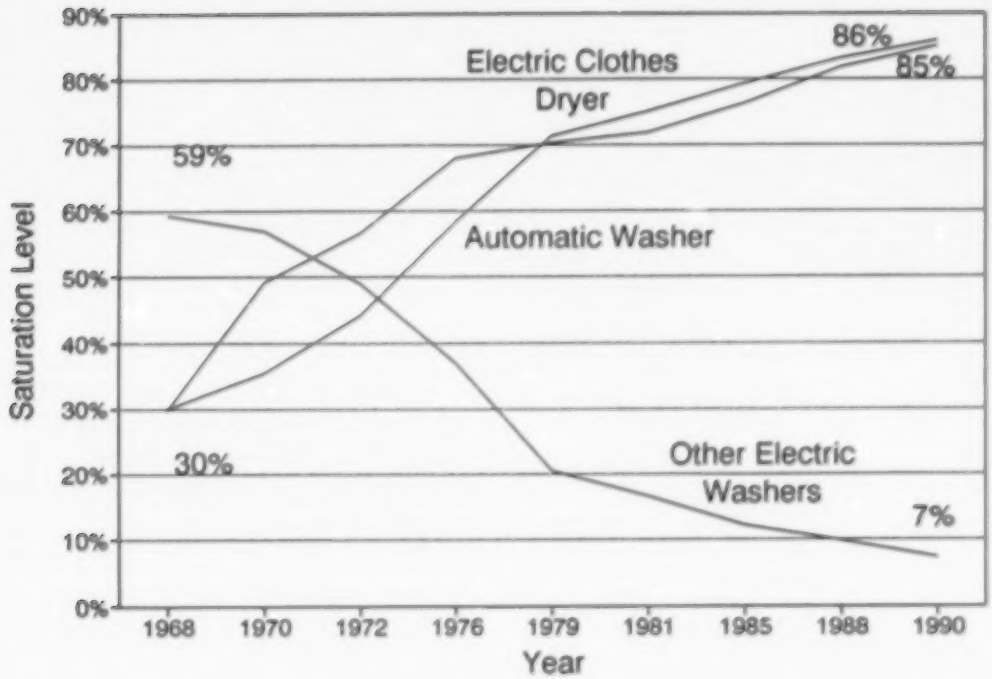


Figure 35
LAUNDRY APPLIANCES



APPENDIX A

APPENDIX A - SURVEY RELIABILITY

All surveys are subject to some degree of error. Because of this, surveys are generally qualified with an expression of the likely range of accuracy (the error) and the level of confidence that the error will be within that range (the confidence). This is usually expressed in the form "the results are accurate within ±5% (*the error*), 19 times out of 20 (*the confidence*)". This means that 1 time out of 20 the difference between the sample results and the population characteristics may be more than 5%.

For a given level of confidence, the error depends on the number of observations, and the percentage of those responses with a particular answer. The following two tables show the error associated with a given number of observations at two levels of confidence: 99% (99 times out of 100) and 95% (95 times out of 100).

To read the tables, take the total respondents for a question and go down the left column until you find the number closest to the total respondents. Take the percent giving the desired response, and move across the row until you find the column whose heading matches most closely that percent. The figure at the intersection of that column and row is the percent error at the level of confidence for that table.

For example, 8411 people responded to Question 25 regarding the primary space heating energy source. Of these, 55.9% said they used electricity.

In Table A-1 (99% Confidence Level), go to the row for **8500** observations, and look at the column for **55% or 45%**. The figure given is 1.4. Therefore, we can say that we are 99% confident that the penetration of electric space heating is 55.9%, ±1.4%.

Using Table A-2 (95% Confidence Level), we see that the same question is accurate within ±1.1%, but only 95 times out of 100. The accuracy has improved, but our confidence in the results has declined.

Table A-1

Reliability Table at a 99% Level of Confidence

Number of Observations	Percentage Response to the Question										
	50%	55% or 45%	60% or 40%	65% or 35%	70% or 30%	75% or 25%	80% or 20%	85% or 15%	90% or 10%	95% or 5%	99% or 1%
10	40.7	40.5	39.9	38.9	37.3	35.3	32.6	29.1	24.4	17.8	8.1
25	25.8	25.6	25.2	24.6	23.6	22.3	20.6	18.4	15.5	11.2	5.1
50	18.2	18.1	17.8	17.4	16.7	15.8	14.6	13.0	10.9	7.9	3.6
75	14.9	14.8	14.6	14.2	13.6	12.9	11.9	10.6	8.9	6.5	3.0
100	12.9	12.8	12.6	12.3	11.8	11.2	10.3	9.2	7.7	5.6	2.6
150	10.5	10.5	10.3	10.0	9.6	9.1	8.4	7.5	6.3	4.6	2.1
200	9.1	9.1	8.9	8.7	8.3	7.9	7.3	6.5	5.5	4.0	1.8
250	8.1	8.1	8.0	7.8	7.5	7.1	6.5	5.8	4.9	3.6	1.6
300	7.4	7.4	7.3	7.1	6.8	6.4	5.9	5.3	4.5	3.2	1.5
400	6.4	6.4	6.3	6.1	5.9	5.6	5.2	4.6	3.9	2.8	1.3
500	5.8	5.7	5.6	5.5	5.3	5.0	4.6	4.1	3.5	2.5	1.1
750	4.7	4.7	4.6	4.5	4.3	4.1	3.8	3.4	2.8	2.0	0.9
1000	4.1	4.1	4.0	3.9	3.7	3.5	3.3	2.9	2.4	1.8	0.8
1250	3.6	3.6	3.6	3.5	3.3	3.2	2.9	2.6	2.2	1.6	0.7
1500	3.3	3.3	3.3	3.2	3.0	2.9	2.7	2.4	2.0	1.4	0.7
1750	3.1	3.1	3.0	2.9	2.8	2.7	2.5	2.2	1.8	1.3	0.6
2000	2.9	2.9	2.8	2.7	2.6	2.5	2.3	2.1	1.7	1.3	0.6
2500	2.6	2.6	2.5	2.5	2.4	2.2	2.1	1.8	1.5	1.1	0.5
3000	2.4	2.3	2.3	2.2	2.2	2.0	1.9	1.7	1.4	1.0	0.5
3500	2.2	2.2	2.1	2.1	2.0	1.9	1.7	1.6	1.3	0.9	0.4
4000	2.0	2.0	2.0	1.9	1.9	1.8	1.6	1.5	1.2	0.9	0.4
4500	1.9	1.9	1.9	1.8	1.8	1.7	1.5	1.4	1.2	0.8	0.4
5000	1.8	1.8	1.8	1.7	1.7	1.6	1.5	1.3	1.1	0.8	0.4
5500	1.7	1.7	1.7	1.7	1.6	1.5	1.4	1.2	1.0	0.8	0.3
6000	1.7	1.7	1.6	1.6	1.5	1.4	1.3	1.2	1.0	0.7	0.3
6500	1.6	1.6	1.6	1.5	1.5	1.4	1.3	1.1	1.0	0.7	0.3
7000	1.5	1.5	1.5	1.5	1.4	1.3	1.2	1.1	0.9	0.7	0.3
7500	1.5	1.5	1.5	1.4	1.4	1.3	1.2	1.1	0.9	0.6	0.3
8000	1.4	1.4	1.4	1.4	1.3	1.2	1.2	1.0	0.9	0.6	0.3
8500	1.4	1.4	1.4	1.3	1.3	1.2	1.1	1.0	0.8	0.6	0.3

Table A-2

Reliability Table at a 95% Level of Confidence

Number of Observations	Percentage Response to the Question										
	50%	55% or 45%	60% or 40%	65% or 35%	70% or 30%	75% or 25%	80% or 20%	85% or 15%	90% or 10%	95% or 5%	99% or 1%
10	31.0	30.8	30.4	29.6	28.4	26.8	24.8	22.1	18.6	13.5	6.2
25	19.6	19.5	19.2	18.7	18.0	17.0	15.7	14.0	11.8	8.5	3.9
50	13.9	13.8	13.6	13.2	12.7	12.0	11.1	9.9	8.3	6.0	2.8
75	11.3	11.3	11.1	10.8	10.4	9.8	9.1	8.1	6.8	4.9	2.3
100	9.8	9.8	9.6	9.3	9.0	8.5	7.8	7.0	5.9	4.3	2.0
150	8.0	8.0	7.8	7.6	7.3	6.9	6.4	5.7	4.8	3.5	1.6
200	6.9	6.9	6.8	6.6	6.4	6.0	5.5	4.9	4.2	3.0	1.4
250	6.2	6.2	6.1	5.9	5.7	5.4	5.0	4.4	3.7	2.7	1.2
300	5.7	5.6	5.5	5.4	5.2	4.9	4.5	4.0	3.4	2.5	1.1
400	4.9	4.9	4.8	4.7	4.5	4.2	3.9	3.5	2.9	2.1	1.0
500	4.4	4.4	4.3	4.2	4.0	3.8	3.5	3.1	2.6	1.9	0.9
750	3.6	3.6	3.5	3.4	3.3	3.1	2.9	2.6	2.1	1.6	0.7
1000	3.1	3.1	3.0	3.0	2.8	2.7	2.5	2.2	1.9	1.4	0.6
1250	2.8	2.8	2.7	2.6	2.5	2.4	2.2	2.0	1.7	1.2	0.6
1500	2.5	2.5	2.5	2.4	2.3	2.2	2.0	1.8	1.5	1.1	0.5
1750	2.3	2.3	2.3	2.2	2.1	2.0	1.9	1.7	1.4	1.0	0.5
2000	2.2	2.2	2.1	2.1	2.0	1.9	1.8	1.6	1.3	1.0	0.4
2500	2.0	2.0	1.9	1.9	1.8	1.7	1.6	1.4	1.2	0.9	0.4
3000	1.8	1.8	1.8	1.7	1.6	1.5	1.4	1.3	1.1	0.8	0.4
3500	1.7	1.6	1.6	1.6	1.5	1.4	1.3	1.2	1.0	0.7	0.3
4000	1.5	1.5	1.5	1.5	1.4	1.3	1.2	1.1	0.9	0.7	0.3
4500	1.5	1.5	1.4	1.4	1.3	1.3	1.2	1.0	0.9	0.6	0.3
5000	1.4	1.4	1.4	1.3	1.3	1.2	1.1	1.0	0.8	0.6	0.3
5500	1.3	1.3	1.3	1.3	1.2	1.1	1.1	0.9	0.8	0.6	0.3
6000	1.3	1.3	1.2	1.2	1.2	1.1	1.0	0.9	0.8	0.6	0.3
6500	1.2	1.2	1.2	1.2	1.1	1.1	1.0	0.9	0.7	0.5	0.2
7000	1.2	1.2	1.1	1.1	1.1	1.0	0.9	0.8	0.7	0.5	0.2
7500	1.1	1.1	1.1	1.1	1.0	1.0	0.9	0.8	0.7	0.5	0.2
8000	1.1	1.1	1.1	1.0	1.0	0.9	0.9	0.8	0.7	0.5	0.2
8500	1.1	1.1	1.0	1.0	1.0	0.9	0.9	0.8	0.6	0.5	0.2